

The Age of Steel.

VOL. LXXX.

ST. LOUIS, JULY 25, 1896.

NO. 4.



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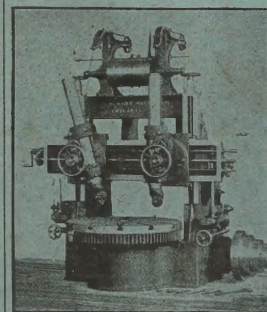


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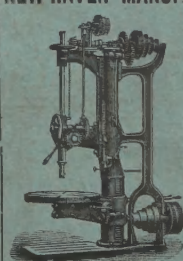
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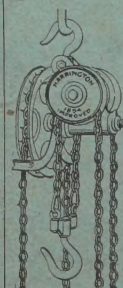
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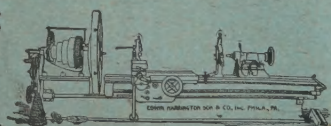
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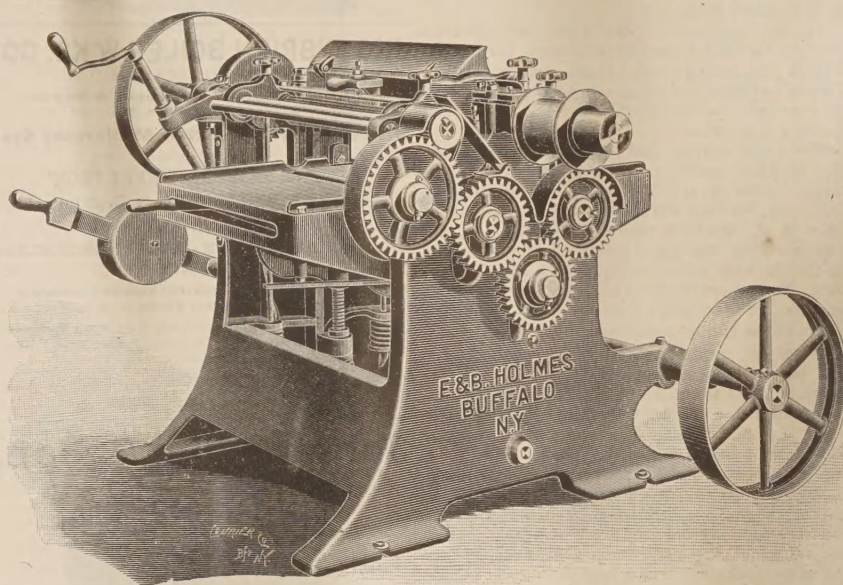
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FRONT VIEW.

changed from nothing to 100 feet per minute by moving a lever, or, if desired the feed can be reversed, and the material backed out of the machine. The machine will do the finest and smoothest work on hard or soft wood, and will plane from 1-16 to 8 inches in thickness, by 24 inches wide.

The feeding rolls are of solid steel, with large bearings, and are powerfully geared; all idle gears being self-oiling. The cutter heads are of hard, crucible steel, and have bearings 2 inches in diameter, and of ample length. The boxes are lined with genuine babbitt metal and are self oiling, and can be adjusted by set screws so that no liners between caps and boxes are needed. The pressure bars are of improved construction and will hold short pieces firmly, so that no end clipping can occur.

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A knife jointing attachment accompanies each machine by which the knives can be kept absolutely straight and true with each other.

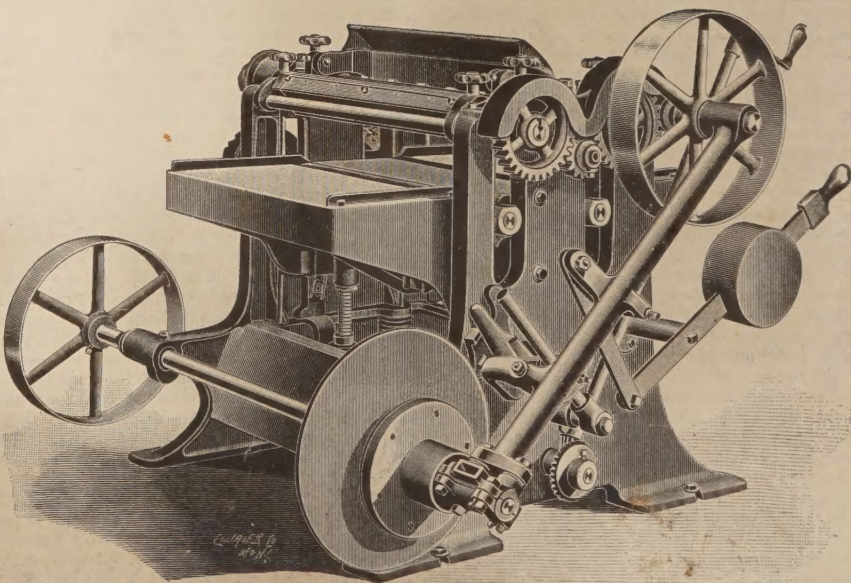
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trical locomotive in the world, exhibited by the General Electric Company, at the Chicago Exposition, 1893, having a rated draw-bar-pull of 7000 pounds, has been purchased by the Manufacturers Street Railway Company, of New Haven, Conn. It

of New York & New Haven Railway at Cedar Hill, which is about one mile from the New Haven depot, to the works of the Bigelow Company, manufacturers of boilers, the National Pipe Bending Company, the Quinpiac Brewing Company, the New Haven Rolling Mills and other manufacturing establishments located along the water front at some distance from the freight yards of the Consolidated Road. The freight cars will be hauled directly into the yards of the manufacturers, and the loads will be collected by the electric locomotive and hauled to the main line of the N. Y., N. H. & H. R. R. where they will be taken by the steam locomotive for transportation to their destination. The length of the line along which this locomotive will run is nearly two miles, the maximum grade against the load being about 2½ per cent. The guaranteed speed of this locomotive on this grade will be seven miles an hour with a heavy load behind it, but judging by its performance at the Lynn works of the General Electric Company it will probably be able to largely exceed the guarantee. All the locomotives, which the General Electric Company have built will be, when this one is delivered at New Haven, in service. The 40 ton locomotive is used as a switch engine at the Taftville cotton mills at Taftville, while the three 96 ton locomotives are engaged in hauling the freight trains through the Belt Line tunnel of the B. & O. railroad; indeed no freight train is hauled through the belt line tunnel of Baltimore except by the electric locomotive. The matter of electric traction on the steam roads since the successful operation of the elevated roads in Chicago, the branch lines of the N. Y., N. H. & H. R. R. and the B. & O. main line with apparatus developed by the engineers at the Schenectady works has elicited the interest of steam railroads all over the world and that we are on the eve of a great change in traction methods can no longer be doubted.

It is announced in the press that the Dillon-Griswold Wire Company, who have lately completed



REAR VIEW.

is equipped with air brake and is being prepared for shipment from the Schenectady works within a very few weeks. Its total weight is thirty tons and it will be utilized to haul freight cars from the junction

their finely equipped plant at Stirling, Ill., are now putting on the market an excellent line of steel band ties, wire nails, barbed wire, and annealed, bright galvanized and market wires.

Western Foundrymen's Association.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, July 15, 1896, at the Great Northern Hotel. The president occupied the chair.

The following were present: F. M. Lyon, Burlington Route Foundry, Aurora, Ill.; A. W. McArthur, Rockford Foundry Company, Rockford, Ill.; John Pettigrew, Illinois Steel Company, W. N. Moore, Joliet Stove Works, Joliet, Ill.; A. N. Wheeler, F. C. Patten Company, Sycamore, Ill.; H. L. Hotchkiss, F. G. Coffin, Deering Harvester Company, Maj. Malcolm McDowell, Hanson McDowell, McDowell Steel Company; H. S. Vrooman, Garden City Sand Company; Wm. Ferguson, E. E. Hanna, Gates Iron Works; John K. Mackenzie, R. N. Dickman, Dickman & Mackenzie; D. Evans, Forster, Waterbury & Co.; S. T. Johnston, Whiting Foundry Equipment Company; A. Sorge, Jr., M. E.; H. F. Froman, S. Obermayer Company; A. M. Thompson, Link Belt Machinery Company; D. H. Truesdale, Cribben & Sexton; Eugene W. Smith, James Marshall, Crane Company; John Rogers, Home Stove Works, all of Chicago.

The application of Mr. J. B. Clements, of St. Louis, Mo., for associate membership in the association was presented, and, on motion, duly seconded; he was elected.

The secretary announced that at the last meeting of the Board of Directors it was decided on a motion duly passed that no regular meeting of the association be held in August. He also stated that the next meeting would be held in Cleveland in September and that notices will be sent to the members as soon as they are ready.

The paper of the evening, "Practical Value of the Various Metalloids in Cast Iron" was then read by its author, Maj. Malcolm McDowell. [The same is reviewed in another place in this paper.—Ed.]

DISCUSSION.

Mr. Dickman: About a year and a half ago I had the pleasure, as well as a small amount of labor, of going through an analogous set of experiments for Mr. Keep, but about that time my attention was turned into a different channel of work and since then I have not been doing much in that line. I may however, state, that both for the scientific interest that we take in such matters, and for the general good that seems apt to result from a systematic investigation of the influence of these metalloids, Mr. Mackenzie and myself will offer to this association our assistance in these experiments and assure you that our part of the work shall receive our best attention, and the benefit of our experience in the chemical part.

Mr. Pettigrew: Way back in the sixties we had one of the smartest men in the country take hold of pig iron and this was Gen. Rodman. He took hold of the Ft. Pitt foundry and made a very decided success in casting his cannon. He had the United States Government at his back. His idea was to have the outer coat of the gun keep a tight hold of the inner coat, and he was successful. He was the first man that ever introduced water into the cores, and he did it successfully. After the cannon was cast he turned on a stream of water right into the core and tested the temperature of the water until the gun was thoroughly cold. At the same time he governed the fire on the outside of the cast to keep the outside of the gun hot. Most of you gentlemen that have seen castings broken have noticed that the castings straighten out instead of rolling up. Gen. Rodman's guns always rolled up when broken.

Mr. Sorge: While the paper outlines a very exhaustive and complete line of work, it should be taken up by the Western Foundrymen's Association. The determination of the exact effect of the varying percentages of each metalloid in cast iron has been attempted partially by various experimenters, but there has never been a systematic series of experiments made on this subject. Every one of us that mixes iron for castings and uses chemistry in doing this has a theory of his own on which he works to produce certain results. Maj. McDowell has his and I have mine. Whether they agree or not I do not know. It is a matter of shop secret with each man to keep that to himself. I do not think it is best, however, to keep it to oneself. I think that sort of thing is improved very materially by discussion and whatever one individual has as a

matter of theory can only be based on his own limited knowledge. But if the work outlined by Maj. McDowell in his paper is carried out it will give us a series of demonstrations that will enable us to state intelligently what the exact effect of each one of the metalloids will be. I consider it so valuable a paper that I think our association should take it up by appointing a committee for the purpose of carrying out these experiments. It is going to be a matter of considerable expense and one that the association must not lose patience about. It will take one, two or three years, possibly more to work this out and the chances are that we will find great difficulty in obtaining the mixtures containing the exact amounts of metalloids we would like to have, and it is going to take patience to get them. I think it is the most important thing, without exception, that is to-day before the foundrymen and I hope to see the Western Foundrymen's Association take hold and carry it through to a successful issue. I believe it can be done.

As to entering into details that Maj. McDowell has brought forward, I think it is too early to theorize. I think that, until we have these experiments before us and have the results in tabulated shape so that we can intelligently look them over, we had better not theorize.

There was another point which I failed to make. Mr. Dickman spoke of the series of experiments made by Mr. Keep. These papers have not yet come out, but they will at the next meeting of the A. S. M. E. We have received parts of them, but the fact is that the line of experiments was entirely in the direction of demonstrating the effect of silicon. Even there the tests were made to establish a standard of test more than to demonstrate the effect of the various metalloids.

Mr. More: I thoroughly agree with the writer of the paper on the desirability and necessity of the work that he has outlined, and I sincerely hope that this association can be instrumental in carrying it out. I, from my limited experience, have reason to doubt what little I sometimes think I know about the subject, and for the reason that there are so many combinations of elements dealt with that when one thinks he has arrived at the point where he knows something and can put a peg down, before he has gone very much further he finds that the thing he thinks was true is true only under certain conditions. As an illustration of that: Sometime ago we had trouble in our castings from shrink-spots. The castings to which I refer are light castings and the shrink-spots occurred where there were lugs or extra thickness. We found that we were running very low in phosphorus, about $\frac{1}{2}$ per cent. Our silicon was what we considered normal, between $2\frac{1}{2}$ and 3 per cent, but the phosphorus was about $\frac{1}{2}$ per cent. We put our phosphorus up about $\frac{1}{4}$ per cent and we found our trouble disappeared. There was no other change in the condition. We set a peg down there that $\frac{1}{2}$ per cent phosphorus is liable to produce shrink-spots and that $\frac{3}{4}$ per cent is all right. Well that stood as good law until recently when my attention was called to a casting which had those identical shrink-spots in it and an explanation was asked to account for them, I said it looked like low phosphorus. The casting was analyzed and showed $\frac{3}{4}$ per cent phosphorus. The law was good until we struck some other combination and then the law did not hold. There was a very remarkable thing in connection with that casting. The sulphur was down to .035, which was extraordinarily low for light castings. Whether that was the changed condition that produced the result or not I do not know and that is not the point I want to raise to-night. I mention it to show how necessary is a comprehensive study of the elements in cast iron. I trust that the result from the reading of this paper will be that this association will take hold of this work and stick to it until we do know something positive about the relations of the metalloids in cast iron.

Mr. Sorge: I feel that it is due to Maj. McDowell to make the explanation that he has stated to me that he hopes the Western Foundrymen's Association will take hold of this matter, but that he intends to go ahead with it himself, if they do not. I think that is a very laudable ambition on his part, but I think he will have an awful job to do it alone.

Maj. McDowell: This has been a subject that I have given a good deal of study; to ascertain what the state of the art was in this country, as well as in the rest of the world; to see if I could not learn what

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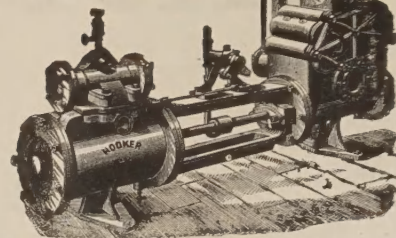
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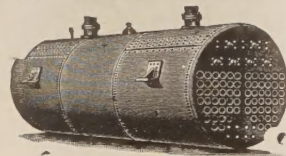
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had been done, so that, if possible, I could get hold of some place where others had left off.

I here give a table showing eight heats that were made in England in a hot air furnace and two made by myself at home in a cupola:

Number of heats	1	2	3	4	5	6	7	8	9	10
Total Carbon	1.98	2.00	2.09	2.21	2.18	1.98	2.23	2.01	2.71	3.12
Uncombined Carbon										
bound	0.38	0.10	0.21	0.50	1.62	1.19	1.43	1.31	1.62	2.19
Combined Carbon	1.62	1.93	1.85	1.71	0.56	0.88	0.80	0.20	1.09	0.93
Silicon	0.19	0.45	0.96	1.37	1.96	2.25	2.96	3.92	0.94	1.34
Manganese	0.14	0.21	0.26	0.60	0.60	0.75	0.70	0.84	0.60	1.25
Tensile strength, per sq. in.	1, 24,000;	2, 27,000;	3, 28,000;	4, 31,000;	9, 32,600;	10, 49,000.				

Eight of the ten different heats giving in the foregoing table were taken from "Howe's Metallurgy of Steel;" the other two heats I made. The first eight were evidently made in a hot air furnace, while the last two were made in a cupola.

Howe says in reference to the eight heats.

"As silicon rises beyond $1\frac{1}{2}$, the percentage of graphite at first increases rapidly, then falls off slowly, while tensile and compressive strength both decline uninterruptedly, while experience shows that no one set of observations on the effect of foreign elements on iron is conclusive. Turner's results are so harmonious as to inspire confidence."

The experiments of Mr. Thomas Turner here referred to are extremely interesting but are not satisfactory, because they treat of iron made in hot-air furnace and their results do not reach the quality of iron made in a cupola. As the general foundry practice in this country is with a cupola, what we want is the value of the metalloids in combination with iron and carbon in making castings from metals melted in a cupola. The quality of our iron castings depends on the amount of carbon there is in them and its relation to the iron whether combined or uncombined. The two metalloids most seriously affecting the relations are manganese and silicon, the former intensifying the affinity iron has for carbon, while the latter, under certain conditions, eliminates and uncombines the carbon. Iron's capacity for absorbing carbon alone is limited to about 4.50 per cent, but when manganese is present in sufficient quantities it will carry from 6.50 to 7.50 per cent and when chromium is substituted for manganese it will carry from 10 to 12 per cent in combination. Iron has a greater affinity for silicon at a certain temperature than it has for carbon and will absorb it to carbon's exclusion, so that silicon pig carrying from 8 to 10 per cent silicon has less than 2 per cent carbon. Where iron is low in carbon, say less than 2.5 per cent and silicon 1.25 per cent or less, the carbon will remain combined, but when the combined amounts of carbon and silicon are over 4 per cent graphite carbon is formed.

No one knows the true value of the metalloids in iron. I have succeeded in making some first-class metal. I would not like to tell you what the mixture was, for the next time it was tried it might not do it. Therefore I had decided to go ahead with a series of experiments feeling sure that there are a large number of institutions in this country that would be only too glad to take up a part of this work. I came to the Western Foundrymen's Association feeling this. It is one of the bright things in the world to know that there is an association of men who, like myself, are making iron. If we can form a combination of individuals out of this association to carry on these experiments it will be of very great value to the entire foundry industry.

Mr. Sorge moved that a committee of three be appointed by the chair to carry on a series of tests and experiments to determine the practical value of the metalloids in cast iron and to carry on this work under the direction of the Board of Directors of the Western Foundrymen's Association.

The motion was duly seconded by Mr. Pettigrew and passed by the association.

The president appointed the following as members of this committee: A. Sorge, Jr., Maj. Malcolm McDowell, John K. Mackenzie.

On motion, duly seconded, a vote of thanks was tendered Maj. McDowell for his paper.

On motion, duly seconded, a vote of thanks was tendered Messrs. Dickman and Mackenzie, for offering their service in this work.

The meeting then adjourned.

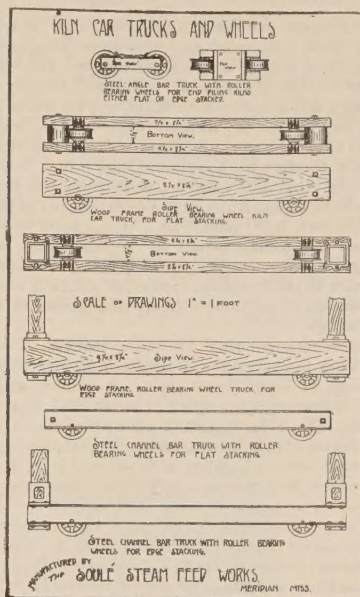
A. SORGE, JR., Secretary.

Uncollectable debts are the nightmare of business men.

Kiln Car Trucks and Wheels.

In the accompanying views we show the improved designs of kiln car trucks and wheels manufactured by the Soule Steam Feed Works, of Meridian, Miss. This company is prepared to furnish steel channel bar trucks for cross piling, either flat or edge; angle bar trucks for end piling—all with roller bearings or roller bearing wheels; in short, everything in the line of kiln trucks and repairs for same enters into the business of the Soule people.

These trucks embody all the latest and best features in the truck line. The company say in this



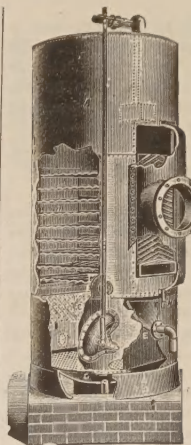
KILN CAR TRUCKS AND WHEELS.

connection that they have found that roller bearing trucks are greatly superior to the ordinary pin bearing, and yet they come at only about the same price as the usual wheels.

Brazing.

In brazing very thin tubes it is important to use spelter or solder which melts at as low a heat as possible. The large-grained spelter will melt more readily than the small, and soft brazing-wire more readily than hard and stiff. But it might not be a bad plan, says "The Ironmonger," to use for very light work a solder which flows at a lower temperature than brass, as thin tubing is so very easily damaged by heating. The amount of solder used in the hands of a skilled workman is so small that the additional cost of silver solder would not be great. Silver solder is made of the following ingredients in the following proportions: Brass wire, 2; copper, 1; fine silver, 19. These should be melted in a crucible under a coat of powdered charcoal, and afterwards hammered into a thin sheet, or else granulated by being poured while still molten into pure water. A solder with a low melting-point is also desirable when a joint has to be brazed close to another which has already been made; but if the first one is known to have been made with brass that has a high melting-point, it is not a necessity to use silver solder for the second, as there is a sufficient difference between the melting-points of different brasses. When there is no other joint in close proximity, and the steel is thick enough to stand a good deal of heat with impunity, a brass solder with a high melting-point may be preferable as it will probably make a stronger joint.

A point which must never be overlooked in brazing is that the tubes easily bend when heated to redness, and may need to be supported at the other end. Should the frame require any truing beyond what can be done cold, it will be a good plan to do it immediately after the brazing operation, before the tubes have cooled down, so as to avoid exposing them to a second heating. But it would not do to stop before the brass is put on to true the frame, as the heat for brazing when once started should be continuously applied, and gradually increased until the operation is completed. Some repairers, to



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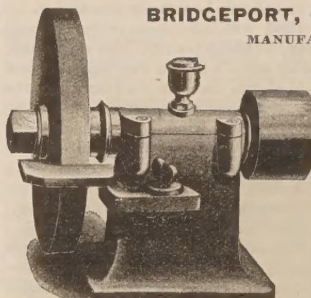
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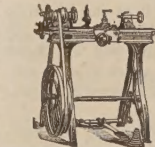
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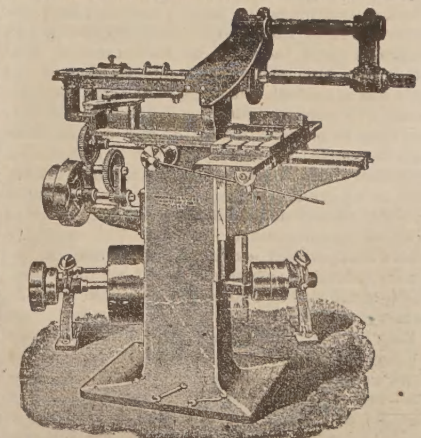
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clean the tubing preparatory to brazing, heat it nearly to redness, and allow it to cool, afterwards rubbing it with emery paper. But it is much better not to heat it, as the less steel is heated the better. The parts may be cleaned with emery-paper, and dipped in a strong solution of alum and water.

Aluminum.

Good Words: Aluminum, lately looked upon as a scientific curiosity, and costing three shillings an ounce, is a metal destined soon to rank next to iron in its usefulness to mankind. Chronologically, the first article made of aluminum was a baby-rattle, intended for the infant Prince Imperial, of France, in 1856. Its lightness, brightness and ring, fitted it admirably for such a purpose; but only a prince could afford such a rattle in those days. Since the time this interesting metal has descended from fashionable articles of jewelry, imperial eagles, sword-handles and military buttons, down to aluminum surgical instruments, horse-shoes, racing yachts, golf clubs, and cooking utensils, which last adaptation bids fair in a short time to overshadow all the rest.

The reason of the great advance in the use of aluminum is that it can be produced at a little over one penny per ounce, and also the peculiar and valuable properties of the metal itself. In these days of economizing labor, a metal one-third the weight of iron and less than one-fourth the weight of lead is sure to obtain a hearing in commerce. A racing horse shod with aluminum shoes carried only a little over the weight of one iron shoe, and, other things being equal will win the race. Dental plates cast in aluminum have only a fraction of the weight of gold plates, but they possess the additional advantage of producing no disagreeable taste in the mouth. If a carpet tack is held in the mouth and touches a gold plate, a bitter sensation is at once felt, due to the electro chemical action set up between the metals and the saliva. Aluminum, on the other hand, is tasteless. This innocuousness gives aluminum exceptional advantages for use in surgery, and patients on whom tracheotomy has been practiced are now having aluminum tubes inserted in their windpipes, instead of silver ones, as was previously customary. These tubes are very light and easy to carry, and after a long time they are found to be covered by a very thin enamel or coating of alumina, almost invisible, and absolutely harmless to the patient. Under the same circumstance a silver tube would be blackened and corroded by purulent matter.

Aluminum, in addition to its lightness and incorrodability, is also a splendid conductor of heat, and it looks as if nature had reserved it as the metal in which we are to cook our food. Unlike copper, it is absolutely free from poison, and will not taint or spoil food. Although certain acids attack aluminum, nothing a man can eat affects it in the least degree.

Messrs. Bowen & Co., Mount Pleasant, Clerkenwell, London, have carried out a long series of experiments regarding the best form of aluminum cooking utensils, and have found that, to get the best results, the vessel ought to be of a certain thickness at the bottom, gradually diminishing towards the top. This form of vessels so distributes the heat that the boiling takes place all round the sides as well as from the bottom. To obtain this desirable result, they had to discard making their stew pans from sheet aluminum, which was too thin and of uniform thickness, and turn their attention to pure cast aluminum, which would enable them to produce vessels of any desired form and thickness. After many failures in overcoming technical difficulties, these cast aluminum pans are now being produced in large quantities, and quite recently aluminum tea kettles and coffee pots have been successfully cast in one piece. The casting is afterwards polished inside and outside until it becomes as bright as silver, and goes forth to its work in the world clad in a lustre more durable than its nobler rivals, silver or gold.

Bulk for bulk, aluminum is already cheaper than copper. It forms about one-twelfth part of the earth's crust (iron coming next), for every common brick contains between 1 and 2 pounds of metallic aluminum. The difficulty of extracting it from the crude clays which contain it has hitherto ruled its cost, for it is not found in nature in a metallic state. The chief water-falls of the world

are now being harnessed to extract aluminum from its ores. For example, the great Niagara, the falls of the Rhine at Neuhausen, some Norwegian Falls, and recently the falls of Foyer, near Inverness, are busy producing aluminum by electro-metallurgical processes in such large quantities and at such a comparatively small cost that this useful metal is sure to become more and more widely employed wherever articles are required which shall not tarnish, and where lightness combined with strength is desirable.

The Chicago Drainage Canal.

The Chicago main drainage canal, now nearing completion, is the most important piece of engineering work at present under construction. The canal will be for the purpose of relieving the city of Chicago, and a contiguous territory, known as the "sanitary district of Chicago," of its sewage, and it is also to be used as a ship canal. The course of the canal is through the Desplaines Valley in a south-westerly direction, and extends from the south branch of Chicago River, at Robey Street, in Chicago, to Lockport, Will County, Ill. At this point will be located controlling works for regulating the discharge, and the outflow, after passing through a tail-race to the Desplaines River at Joliet, follows this stream to the Illinois River, and thence to the Mississippi.

Before constructing the main channel, it was necessary to control the Desplaines River, which, although an insignificant stream at ordinary stage, at flood times reaches a flow of 800,000 cubic feet per minute. This river diversion work necessitated the excavation of 13 miles of artificial channel parallel to the canal, and the building of 19 miles of levee from the spoil of both channels. This work was accomplished by an outlay of more than \$1,000,000.

Through the rock divisions of the canal, the specifications require that the side walls be formed by channels made in one to three cuts by channeling machines, and where necessary, walls of masonry laid in cement will be built upon the rock surface to a height of five feet above low water level (1847) of Lake Michigan. Where the excavation is wholly through earth, the banks of the canal have a two-to-one slope, no masonry being used. The grade in the rock sections is one foot in 20,000, and the canal is designed for an ultimate flow of 600,000 cubic feet of water per minute, providing for a future population of 3,000,000 people.

The expense is to be borne by the people of the "sanitary district" comprising all of the city of Chicago north of Eighty-seventh Street, together with some 43 square miles of Cook County directly benefited by the improvement. The population of the district is about 1,750,000.

According to present estimates, it will cost \$27,303,216 to complete the work, which, when finished, will be 35 miles in length, will necessitate the removal of 39,972,762 cubic yards of material. In the rock section of the canal, which is 160 feet wide and 35 feet deep, 12,071,668 cubic yards of material will be channeled, drilled, and blasted out of solid rock.

On account of sharp competition, the contracts were let at a low figure, and to realize a profit the contractors were obliged to employ every available means to cheapen the cost of excavation.

As an instance of the ingenuity displayed, we cite a few of the unique arrangements devised.

Mr. Jackson, of the contracting firm on section 10, first grasped the thought, which, when developed, produced Brown's cantilever hoist, a balanced steel framed truss, 342 feet long, which reaches over the canal opening, and across a 50 foot berne and over a mountainous spoil bank, whose apex may be 90 feet above the ground. This machine, with clockwork precision, takes away about 600 cubic yards per day.

Another efficient device for handling the excavated materials is the Lidgerwood traveling cableway, also developed on this work. It consists of a main wire cable, suspended from two movable towers about 700 feet apart, and spanning the canal, berne, and spoil bank. At the base of one of the towers is located the operating mechanism. The load is supported from a carriage traveling on the main cable, and is controlled by smaller ropes leading to the engine. Five hundred cubic yards per day is the average work of this device. We are indebted for the above to a pamphlet issued by the Ingersoll-Sergeant Company.

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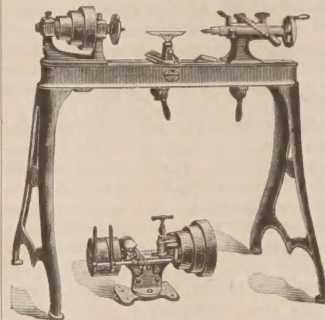
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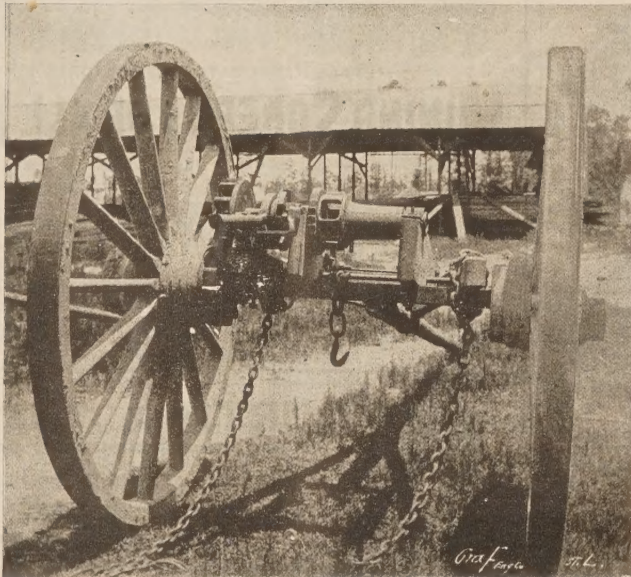
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The Spotswood Log Hoist.

We present herewith an illustration of a device known as the "Spotswood Log Hoist." It is the invention of T. E. Spotswood, formerly manager and later superintendent of the Seaboard Manufacturing Company at Fairfield, Ala. The Union Iron Works Company at Selma, Ala., are interested with the inventor in the patent, and are able to supply the log hoist in any number at a reasonable cost. In using this device the cart is drawn over the log in the usual manner, the teamster then runs the log chain around the log and places the end link over the roller "meg" pin, tightening the chain by hand by pulling the roller over to the rear of the cart. The chain is easily and rapidly made taut, a movable clutch in connection with a fixed clutch is moved by a handle and the team started. Cogs on the hub of the wheel operate on cogs on the shaft above, the cart roller is thereby set in motion and the log is hoisted from the ground. The clutch is now disengaged without stopping the team, and a pawl holds the roller. At the Union Iron Works a log 24 inches by 16 feet was hoisted by one mule. The leading claims for this device are that the operation can be performed by a boy or a small man, that the hauling power by the team is increased, and the usual danger of injury to the driver by slipping pawls, breaking docking sticks, etc., is en-

"Yes, sir."
 "Have you had any experience?"
 "I've been in the business all my life."
 "You are used to handling gasoline, then?"
 "Yes, sir."
 "And you are well up in electricity?"
 "Thoroughly."
 "Good! Of course you are a machinist also?"
 "Certainly."
 "And I presume you have an engineer's certificate?"
 "Of course."
 "Very well. You may go around to the out-house and get the motorcycle ready. My wife tells me that she wishes to do a little shopping."

The figures of copper production and export for the first six months of this year, although more or less anticipated by the monthly statements, make a wonderful showing. The importance of the foreign market to take our surplus product never found such an illustration before, as our home market would have been entirely swamped by the home output. The total increase in the United States production was 11,668 long tons or 14.6 per cent., and the increase of exports, far in excess of increase in production, amounted to 74.1 per cent. The stocks in sight in England and France are placed at 30,729 tons on the 30th of June, and the quantity afloat from Chile and Australia 5,550 tons,



THE SPOTSWOOD LOG HOIST.

tirely removed. The device can also be placed on any iron axle in about two hours by the usual log cart repairer, and can be readily used without previous instruction or experience. The invention certainly deserves the close attention of lumbermen generally.

Manufacturers of Spokes are Having Quite A Boom.

Messrs. Weis & Lesh, the well known manufacturers of Jackson, Tenn., recently almost doubled the capacity of their plant, and paradoxical as it may seem, did, by reducing the number of their machines, or, more properly speaking, by replacing their equipment of twelve lathes, which have been running five years, with seven of the Egan Company's new and improved automatic lathes. With these lathes, owing to the many improvements embodied in them, Messrs. Weis & Lesh, are, as stated, enabled to nearly double the capacity of the plant, and to better advantage than had the old lathes been retained and fewer new ones added.

What it Will be in 1900.

"You advertised for a coachman, sir," said the applicant.
 "I did," replied the merchant. "Do you want the place?"

a total of 36,279 tons, as against 36,901 on May 31st, thus showing a small decrease of more than 300 tons during the month, and a decrease of 22,236 tons as compared with July 1st, 1895.

Wm. C. Johnson, of the firm of Wm. C. Johnson & Sons, the well-known machinery dealers on Second Street, has been limping around the past few days, suffering from the effects of an encounter with a cow out on his ranch. This wonderful cow punished Mr. Johnson with a piece of 4x4 scantling. It is not quite clear to us how the cow struck him with this scantling, but it is a fact nevertheless that he was struck. Some of his friends, though, think that he is trying to work the same racket that he did when he told them some while ago about being bit by one of the lathe dogs at his store.

The boiler of a tramway engine belonging to the Nebraska Lumber Company, at Doucette, Tex., exploded on the 22d ult., instantly killing A. L. Doucette, president of the company; Wylie Sargent, Charles Walforth, Grant Hammerly, Patrick Vincoe and a section hand who went by the name of "Frenchy." Among the injured were Danner Harmon, the locomotive fireman; a section hand named Dennie, and a young farmer by the name of Dowling. The explosion is said to have been caused by letting the water get low in the boiler, and pumping cold water in. All the parties killed were white men, and their tragic ending is deeply regretted by their fellow-townsmen.



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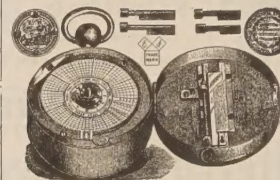
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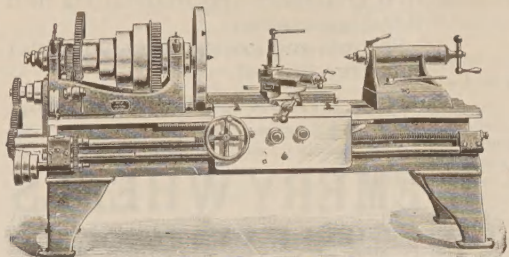
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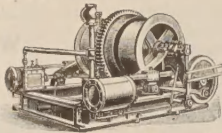
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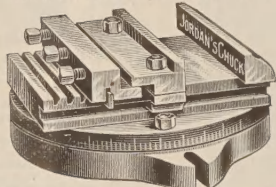
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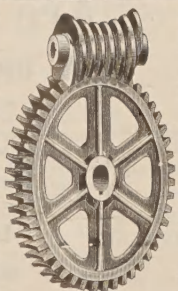
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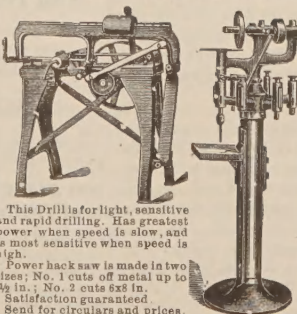


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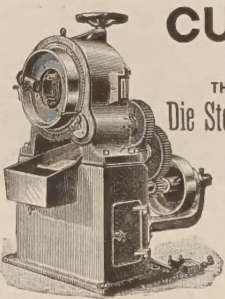
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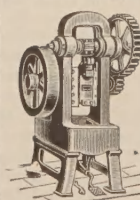
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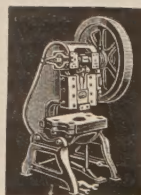
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THE AGE OF STEEL.

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MINIMIZING ELECTRICAL PERILS.

The minimizing of electrical perils has become a question of vital importance. The uses of electricity are constantly multiplying, the increase being at a greater ratio than the practical knowledge necessary to its safe manipulation. The results as might be expected have in many cases been disastrous both to life and property. The chapter of accidents is constantly lengthening, new phases of danger appear in an interminable series, and the matter is rapidly assuming an importance not to be easily over-rated or denied. With some of the most perilous forms of risk the general public are more or less informed and are consequently cautious, sometimes unreasonably timid and frequently unnecessarily apprehensive. Men avoid a broken wire as they would a lighted fuse, a dynamite cartridge, or an aggressive rattlesnake. They have some knowledge of the risks incurred by leaning against an iron post with its web of wires on a rainy day, and are not to be very often found taking hazards in handling the wires attached to chimneys and cornices, or to fooling in any way with electrical apparatus in the home, the street, or the workshop. There are other forms of peril, however, equally as deadly that are known only to experts. It is from these unsuspected sources of danger that ever and anon some tragical surprise is sprung on public attention. A writer in the Pittsburgh Dispatch with a view of ascertaining from leading electrical experts, the nature of these unsuspected and hidden dangers—disregarded because generally unknown—interviewed the famous Nikola Tesla. The instance was quoted of a business man who was instantly killed by a shock received via a strip of moulding covered with dry gilt paint. In remarking on this fact the great electrician said:

"Every metallic paint is a conductor of electricity, and it is only one of the many dangers to which persons unaccustomed to dealing with that fluid are subject. You cannot call it a new danger, as it has existed of course ever since electricity was first put to practical use. It is, however, a new instance of the fatal result of carelessness in dealing with it."

He also added, "the great minds in the sphere of electricity are constantly seeking to minimize the danger of high voltage in cities. They are striving to render it as harmless as it was in the hands of the Greeks, for therein lies a discovery that will be as great a boon to mankind as its manifold benefits."

In order to avoid anything having an alarmist character, the scientist further said:

"Any one is infinitely more safe in an iron building amidst scores of wires than in a brick or wooden building, because the very proximity of so many wires would tend to draw the electric current one from another, and the iron would draw it from all, thus minimizing the danger to any person in a building where electric wires are in use. Death might of course be found in a gilt picture frame, providing the current was strong enough and the conditions permitted a ground connection. It would be perfectly safe to touch any object that might be charged with electricity provided the feet

did not touch the floor, or that the latter was of dry wood, carpeted or covered with some other non-conductor. But if the floor should be of iron or other metallic substance, or of wet wood, the necessary ground connection would be there, and the current would pass through the body. This is a subject which should be generally taught."

There can be no question as to the pertinency of the inquiry we have noted, nor to the vital necessity of a more general knowledge of the laws and appliances of electricity. To deny danger in the face of incontrovertible facts is folly. To leave these facts unheeded is equally asinine. Ignorance is in many cases the parent of unjustifiable panic. To understand a danger and to know how to avoid it is just now what is wanted to make the use of one of the greatest forces of nature a safe and universal service. That this will be done is simply a matter of time and knowledge.

AMERICAN EXPORTS OF FINISHED PRODUCTS.

The export of American goods during the present year have shown an encouraging increase. Some of this may be more or less qualified by the prevalence of low prices, and the pressure of over-production, the dumping of products being more of an emetic than a healthy condition. Giving this, however, all reasonable latitude, and the swing to the full measure of the string, the increase in our exports of manufactured goods has had a strong stimulant in American aggressiveness. This has been accentuated by the economic conditions making a surplus of home production the pointed vowel in the spur of our export trade. The same conditions will insist on a loose bridle and a fair race for commercial supremacy. The freer movement has been more manifest in machinery, locomotives, glassware, fabrics, copper and leather goods, electric and scientific instruments and petroleum.

The total of exports for the fiscal year is placed at \$225,000,000, an increase in value of \$40,000,000 over the corresponding period of the preceding fiscal year.

There can be no good reason to anticipate a reversal of present encouraging conditions unless some blight political or otherwise should stultify or stagnate our commercial relationships with other nations. Such a reaction may not be impossible, but it is hardly likely. The tide of commerce is set in the right direction, and transient obstructions to its onward course are not likely to impede an irresistible movement. The energies and enterprise of a great nation are running at present along commercial lines; they may be checked by untoward events, but can never be practically annulled even if temporarily frustrated.

PIG IRON STATISTICS FOR SIX MONTHS.

The American Iron and Steel Association has compiled complete statistics of the pig iron production for the first half of the present year. The figures from this source are carefully and conscientiously collated and are reasonably and confidently accepted as being as close to facts as it is possible to make them. As iron enters so largely into the industrial fabric of the United States, and as its rise or fall in production is practically the gauge of business prosperity or depression, its reliable and authenticated statistics are of exceptional value. According to these figures the production of pig iron in the United States in the first half of 1896 was 4,976,236 gross tons against 4,087,558 tons in the first half of 1895 and 5,358,750 tons in the second half of 1895. Pig iron of Bessemer quality in the first half of 1896 made a total of 2,793,672 gross tons, against 2,402,023 tons in the corresponding period of 1895, and 3,221,672 tons in the second half. This shows a decrease of production in the first half of 1896 as compared with the second half of 1895, and is attributed in some degree to an increasing demand for open-hearth steel and for basic steel made in the open hearth. The production of basic pig iron in the first half of the present year is tabulated as follows:

New York and New Jersey.....	6,171
Pennsylvania—Allegheny County.....	88,573
Pennsylvania—Other Counties.....	38,875
Virginia and Alabama.....	47,546
Ohio and Wisconsin.....	18,430
Total tons.....	199,595

The increase of production of pig iron according to States, showing the difference in output between the first half of 1896 and the second half of 1895, places the following States as in this class: Con-

necticut, New York, New Jersey, Maryland, Virginia, North Carolina, Illinois, Michigan and Wisconsin. Those showing a decrease are Massachusetts, Texas, Pennsylvania, Georgia, Ohio, West Virginia, Missouri and Colorado. States showing but little variation of output for the same periods are Kentucky, Tennessee and Alabama. Production according to fuel used is thus tabulated:

PRODUCTION ACCORDING TO FUEL USED.

Fuel used.	Blast Furnaces.				Production. Gross tons of 2240 lbs. (Includes spiegeleisen.)		
	In blast Dec. 31, '95	June 30, 1896.			First half of 1895.	Second half of 1895.	First half of 1896
		In	Out	Total			
Anthracite ..	56	40	79	119	487,479	783,420	684,011
Charcoal ..	23	28	69	97	103,001	122,340	136,697
Bituminous ..	163	128	125	253	3,497,078	4,462,990	4,185,528
Total	242	196	273	469	4,087,558	5,358,750	4,976,236

Furnaces in blast June 30, 1896, were 196 as against 242, December 31, 1895. Those out of blast, June 30, 1896, were 273.

In the matter of unsold stocks of pig iron, June 30, 1896, the figures show an increase over those of December 31, 1895. Unsold stocks at the end of June in the hands of manufacturers or their agents, and not intended for their own consumption, made a footing of 644,887 gross tons, against 444,332 tons, December 31, an increase of 200,555 tons.

These totals do not include pig iron sold and not removed from furnace banks, nor that manufactured by rolling mill proprietors for their own use. These stocks according to fuel used are thus tabulated:

STOCKS ACCORDING TO FUEL USED.

Bituminous.....	227,007	129,596	194,363	390,883
Anthracite.....	119,598	109,007	116,936	113,311
Charcoal.....	250,183	200,687	135,033	140,693
Total.....	597,688	439,290	444,332	644,887

In a foot note appended to these statistics the Bulletin says:

"The American Pig Iron Storage Warrant Company held in its yards on June 30, 1896, 112,000 gross tons of pig iron, nearly all of which was in the South. Of this total 51,040 tons are included in the above tables as being still controlled by the makers, leaving 60,960 gross tons of pig iron in other hands, much the larger part being in Alabama."

The total of unsold pig iron is placed at 705,847 gross tons on June 30, 1896, and that of December 31, 1895, at 506,132 tons.

In these statistics that represent an enormous amount of thorough and painstaking labor, we have the pig iron situation as outlined at the date of this exhaustive and valuable report.

THE BLUDGEON IN LABOR TROUBLES.

No man interested in the progress of labor towards higher and better conditions but sincerely regrets every act of violence perpetrated in the name of a fair demand for justice. That such acts will occur without premeditation or encouragement in times of excitement everybody admits. Human nature has to be taken for what it is, and not always for what it ought to be. If all men were wise, prudent and just, there would be no cracked heads either in political or industrial agitation, but as a matter of fact these virtues or qualities are not so much in evidence as they ought to be, in so advanced a stage of civilization, as we sometimes pride or delude ourselves as having reached. The barbarian and the brute are by no means extinct. They are simply under restraint. It is largely a case of personal or social repression. It breaks out sometimes as a fire does when the hose is on the reel, or as the wild animal does in a tame cat when a canary is in reach of its paw. It is the spirit that makes a cock pit attractive, or a prize fight more interesting than an eclipse of the moon. The jingo has his stock argument in this weakness of human nature, and the oppressor and the despot the agency of his triumph. We can as well expect a leopard to lurch on lettuce, or a wolf to dine on clover, as to expect every man to abstain from violence when his passions are aroused. This admitted, it does not follow by any means that intimidation or assault are justifiable especially in cases of labor disputes. In nine cases out of ten, the opposite policy is not only the best, but the only means of removing industrial friction, and securing recognition of justice. Protests are not made either logical or successful by brickbats. Coercion by the bludgeon can never

right a wrong, or change the conviction of an opponent. There is no light thrown on a labor dispute by an incendiary torch; it simply reveals the scoundrel that carries it. Cracking the head of a policeman or pulling the ears of a militiaman are blind methods of correcting the payroll of a foundry or a street car line. Yet even at the date of writing this brutishness is mistaken for a solvent of grave labor problems. Does any man really suppose that breaking the nose of a non-union man inspires an affection for unionism, or that public sentiment can be won over by any such methods? We venture to say that such acts as these have done more to estrange industrial relationship and to blind men as to the real causes of labor discontent than almost any other impediment to industrial harmony and progress. We may blame hoodlums, toughs and scoundrels at large for many of the vicious and criminal acts that are done during strikes, but however strongly this may be proven, the fact remains in too many instances the bludgeon is in other hands. When labor goes further than a verbal protest against this violence and promptly ejects all such fools from its associations, the crimes against order and human rights will be saddled on wild asses and not on those who have a just cause for dispute or agitation. When we need a Gatling gun in the Supreme Court we may need the bludgeon in strikes. As it is justice and fair play are worth more than a pile of rocks.

STREET RAILWAY COSTS AND FARES.

The street railway has become an indispensable factor in modern city life. It has developed rapidly and is likely to continue doing so for some years to come. Electricity has had much to do with this sudden and unexampled deployment. Its advantages in a motive-power as well as in an economic sense are practically beyond controversy. Its popularity is thoroughly established, and in much if not most of our city and suburban traffic it is inseparable from public convenience and transportation. Improvements in equipment are constant; dispatch and promptness are up to date, so far as the modern craze for speed is concerned; safety appliances are nearer the desired point than ever; management is more systematized and able, and in every way where conditions are susceptible of improvement, the mark of progress is being made. All this has necessarily involved heavy outlays of capital. The total so far as the entire country is concerned represents an enormous investment, while what with wear and tear, new and improved mechanism, and constant improvements in construction and furnishings, the outgo is heavy. It is needless to say that the original costs far exceed those of maintenance. The ratio of expenses is likely to diminish rather than increase, and as net earnings grow faster than mileage, it is not unreasonable to suppose that lower rates for travel must sooner or later be in order. In a very interesting summary of the situation by the "Springfield Republican," the following figures are quoted from the "Street Railway Journal," showing facts relating to the cheapness of transportation under existing rates. The first column gives the longest ride for 5 cents, and the second the rate per mile in cents for the maximum journey:

City.	Lowest Ride for 5 Cents	Rate per Mile.
New York.....	12.5	.0040
Chicago.....	15	.0033
Philadelphia.....	11.75	.0043
Brooklyn.....	18	.0028
Boston.....	9.9	.0051
St. Louis.....	15	.0033
Jersey City-Newark.....	8.25	.0060
San Francisco.....	12	.0041
Minneapolis-St. Paul.....	12.94	.0039
Cincinnati.....	13.44	.0037
Cleveland.....	10	.0050
Buffalo.....	13.75	.0036

In a table showing the cost of operating street railways, the authority quoted makes use of the figures given by the "Financial Chronicle," the table referring particularly to Massachusetts:

	Miles Track	Electric Track	No. of Cars	Net Earnings.	Ratio Oper'g Exp.
1895.....	1078	1016	4426	\$4,096,256	68.9
1894.....	928	825	4058	3,390,788	69.6
1893.....	874	711	4040	3,330,229	69.2
1892.....	755	496	3659	2,768,581	71.7
1891.....	672	289	3494	2,115,537	76.1
1890.....	612	161	3247	2,104,077	74.8
1889.....	574	51	2942	1,624,771	78.4

In further comment on the situation our contem-

porary says: "That the revolution in motive power and equipment which has lately overtaken the street railways has only resulted in placing them in a much stronger financial position than before can hardly be denied in the face of these statistics, and as their development goes on still lower fares can in all probability be fairly exacted."

Not only has no political party in the United States ever declared for the single gold standard as a fixity, either categorically or by implication, but on the contrary both gold and silver as standard money have been favored in all national platform planks relating to metallic money. These formulations of party policy have been uniformly bimetallic in expression and in the construction placed upon them by the great masses of voters. Nor has the rule been broken in this year of wide and deep divisions over the money question. The Republican party has pledged itself to bimetalism, to be achieved through international agreement, which it promises to try and bring about, while the Democratic and Populist parties insist that bimetalism can be had by this country taking the initiative and opening its mints to the free coinage of both metals. The end sought is the same in each case; the only difference is in the methods proposed for accomplishing it. Gold would be cheapened just as much, and possibly somewhat more, by international action favorable to silver as by national action in forcing up the commercial price of silver to correspond with our coinage ratio, with the chances of the scheme's general success much better by the former plan than by the latter. Wherefore should there be so much heat and so little reason shown in a discussion which does not involve principles, but only methods. We are all gold bugs and silver bugs in the sense that we want to secure the free and unlimited coinage of both gold and silver at a ratio which can be safely maintained. This desire is whetted to a keen edge among many classes of people by the contracting effects of the gold standard on both our domestic and foreign trade, and its broadening effects as a debt maker, but in no degree is it anarchistic or socialistic. Nor is it whimsical. It is honest and earnest, and if defeated of its purpose for even the time being, it must be by argument and reason coming from honest sources. The ranting of newspapers edited in the counting room will not do it.

The figures of immigration for the last fiscal year show that 263,700 immigrants landed in New York. This was excess over the figures of the previous year by 72,781. Of this total Italy contributed 66,445; Germany, 24,330, and Austria-Hungary, 52,085. The money brought to the United States averaged \$13.78 per head, the lowest average per capita being among the Hungarians. It would probably be somewhat of a surprise if the average wealth of the immigrants at the end of ten years could be estimated. The restriction of immigration may be a wise and necessary policy, but at the same time it is not to be forgotten that much of the wealth now credited to the United States would be missing had it not been for the immigrant who with but his trunk, a handful of cash, and his old-country muscle in working out his own prosperity added to that of his adopted country. Many a man with but a pair of brogans and a last sumpence has unconsciously aided in the building up of this great republic.

Electricity as an active agency in promoting the sanitary conditions of work shops, coal mines and steamships, was for a time overlooked in the novelty of a new form of motive power. Its advantages in this important matter are, however, being rapidly appreciated. An instance of this is afforded in the adoption by the German Admiralty in substituting electric wires in the place of steam pipes in their war ships. The heat resulting from the use of steam pipes made the engine room and related departments exhaustive and unhealthy. The electric wire has remedied this evil. The interior of a modern war ship is none too cool, and electricity has stepped into the huge fire box to curtail some of its intolerably heated conditions.

The uses of asbestos are being constantly increased, as in fact is every other form of material capable of being pressed into commercial service. In the present instance it is prepared asbestos wool in

the soles of boots. It has water proof abilities. It refuses to sympathize with either heat or cold, and should the wearer step on a live electric wire, the only shock he can receive would be imaginary. If these advantages can be secured by the use of a middle sole of asbestos, all wearers of boots and the makers thereof are to be congratulated. The time honored maxim "nothing like leather" is evidently wearing at the edges.

The United States Government is about to test the practical value of aluminum steam-jacketed kettles in the navy. If a success their general adoption will follow. In other lines of service where aluminum is a demonstrated success the Government is making a free use of the metal. There can be no question as to the future of this ubiquitous metal. Its abundance is beyond computation. Science is constantly devising new methods of cheapening production, and this secured the commercial uses of aluminum may be expected to multiply on every hand.

The agitation of the money question has temporarily diverted the attention of the New York newspapers from English to American affairs. That they are not pleased, however, with an interruption which places them at so manifest a disadvantage is evidenced by their intemperate language.

AMONG THE ENGINEERS.

Thos. Russell, formerly engineer of the Crystal Water Company, is now chief engineer of the Grand Laundry.

F. E. W. Korte, chief engineer of the Alton Packing and Refrigerating Company, was in the city for a few hours last week.

At the last meeting of No. 2 St. Louis Association of Engineers, an explanation of "How a Weston Ammeter Works" was discussed by a number of members, and some very instructive information was brought out.

The Bates Machine Company, of Joliet, Ill., sent a model of their latest improved Corliss valve gear to No. 2, St. Louis Association of Engineers, for inspection. It was very interesting for the members to see so complete a model.

Fred Berger, formerly engineer of the Reardon Glue Company, is now located at the Taylor Manufacturing Company, Broadway and John Streets; though not a very active member of No. 2, he has promised to attend more regularly.

St. Louis Association No. 2 laments the loss of Bro. Edward Bannon, who died Saturday the 18th inst. at 5 o'clock. He was engineer for the Kerwin Ornamental Glass Company for a number of years. Resolutions of sympathy were adopted, and a great many members attended the funeral. He leaves a wife and two children.

There has probably never been a more valuable piece of machinery added to a brick yard than the mechanical shovel lately invented by Wm. Manson, engineer of the Superior Press Brick Works. To say it works to perfection is putting matters only mildly. It has a capacity of loading sixty carts an hour.

Edward Lewis, engineer of Station A, Laclède Gas Company, Second and Convent Streets, was initiated in No. 2 St. Louis Association of N. A. S. E. last Saturday.

Louis Burris, engineer of Medart's Pulley Works, is a very active member of No. 2 N. A. S. E., always taking great interest in the lectures.

Mr. Jas. Stewart, of No. 15, Evansville, Ind., N. A. S. E., was in the city for a few days. While here he paid a visit to National President Chas. Garlick of the Crystal City Glass Company, returning to Mt. Vernon, Ill., where he is chief engineer of the car works.

Ernest Vollmer, chief engineer of the Union Dairy Company, Washington and Jefferson Avenues, takes pleasure in showing visitors the many improvements which have been and are still being made in that company's fine steam plant.

The old Premier steel plant at Indianapolis, Ind., is to have a new lease on life. It is to be operated by the American Steel Company, lately organized in West Virginia, in the interest of the American Tin Plate Company, of Elwood, and the American Wire Nail Company of Anderson, Ind.

TWO LABOR SAVING DEVICES.

BY C. K.

Skill, in any kind of mechanical business, comes only after long practice, and comes much quicker to the person who takes an interest in the matter from a personal inclination for that particular line of work. The record of those who have become celebrated shows in most cases that they had a natural taste which developed while quite young in the direction of their chosen profession. The boy that tries to learn the machinist's trade without this natural inclination for it seldom achieves a great reputation. A settled purpose, and patient persevering effort, which is necessary for success in every line of business, will accomplish much. For those who have not acquired the necessary skill to file a piece of metal straight, (which is one of the tricks of the machinist's trade that requires considerable practice, though apparently a very simple operation), the illustration herewith shows a neat and effective method for truing up small pieces after roughing them out with the file.

Fig. 1 represents a side view of a speed lathe spindle A, with the common woodscrew center and flange for wood turning, B. On it is screwed a piece of seasoned fine grained hard wood, C, (maple or birch preferred) $\frac{3}{8}$ or 1 inch thick, and of a diameter of about $1\frac{1}{2}$ inches less than the width of a sheet

pared with emery wheels and has the decided advantage of a clear space across the face of the wheel, and of the ease with which changes can be made from coarse to fine work. By using the finest paper pieces from the milling machine may be polished without altering the truth of the surface.

The efficiency of a belt depends on its close adherence to the face of the pulley while in contact, and to make that contact perfect the surface of the pulley must be of a shape that will allow the full width of the belt to bear with equal pressure.

Pulleys that are turned with taper each way to the center of the face will have a polished line in the middle after use plainly showing an unequal pressure.

The best results come from a circular surface as shown in Fig. 4 at I, which represents the carriage of a weight lathe and pulley with a former, J, to give the crown to the surface by the rise and fall of the point of the tool as it travels across the face. The former can be made of any size according to the width of the pulley to be turned.

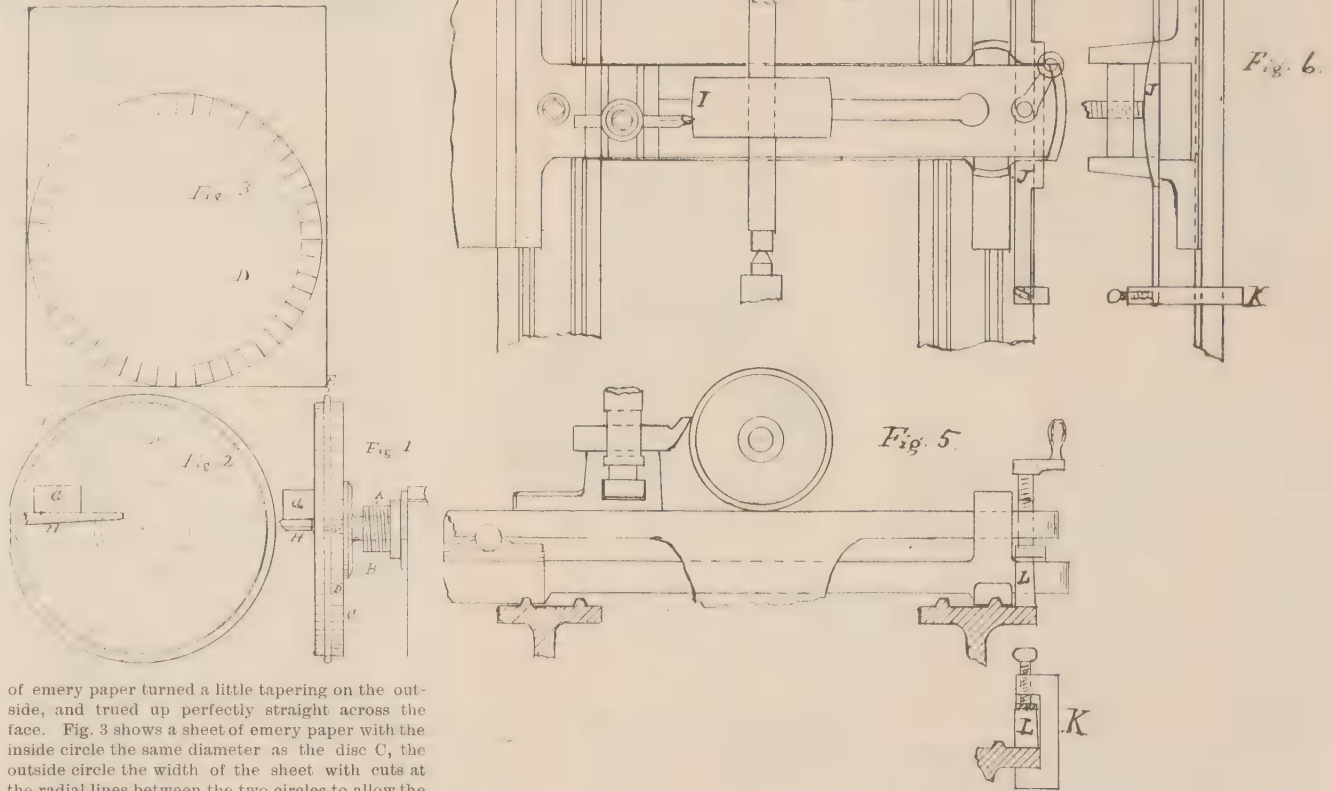
It is secured to the bed of the lathe with the part

once in the diameters of the thickness of the rims of the pulleys or even more as in the patent loose pulley with flange next to the tight pulley.

PERSONAL.

B. Richards, superintendent of Western Valve Company, of Chicago, was in the city for a few days accompanied by his wife. He had just completed an extended trip through the South, and reported trade as only fair.

E. P. Gridley has been appointed superintendent of the Sweetwater Coal Mining Company, Rock Springs Coal Company, Van Dyke Coal and Mining Company, and the Wyoming Mercantile Company, at Rock Springs, Wyo., succeeding Chas. R. Folsey, and took full charge of all business and interests of said companies at Rock Springs, July 2d, 1896. The company have made important improvements in their loading and rescreening plant, by which they are enabled to load coal, the preparation of which has never been excelled. Their capacity has also been



of emery paper turned a little tapering on the outside, and trued up perfectly straight across the face. Fig. 3 shows a sheet of emery paper with the inside circle the same diameter as the disc C, the outside circle the width of the sheet with cuts at the radial lines between the two circles to allow the paper to be turned over onto the edge of the disc at D E is a wire ring scarfed and brazed, of inside diameter equal to the outside diameter of the wood disc with the two thicknesses of emery paper added. With the paper laid smooth on the disc, the clipper edges turned over and the wire ring forced on till it binds the paper firmly on the taper of the disc we have a flat cutting surface which can be run at a quick speed and do considerable execution in cutting away metal by using coarse emery paper (and paper is better than cloth), for roughing, finer for finish, and the finest for polishing. It is well to have two or three wire rings of such diameter as will bind the different thicknesses of emery paper near the front edge of the disc, holding the paper more securely.

The change from coarse to fine paper is quickly made, and the surface it gives will be as true as the best filer can make it in twice the time.

By using a rest, H, Fig. 2, with a straight surface at right angles with the face of the wheel the finishing of screw heads or similar work is quickly done. The cost of the arrangement is trifling com-

J between the elevating screw and lower part of the carriage resting on blocks L, held by clamps K, at any desired position. With the elevating screw at the center of the former, and the point of the tool at the center of the pulley, it can be turned circular as readily as straight. Fig. 5 gives the side elevation and Fig. 6 the end, showing the position of the former J. Fig. 7 shows the clamps K, with the blocks L of the same height as the lower part of the carriage. If the point of the tool is considerably above the center line of the lathe, the curve on the face will be greater than when lower down. The elevating screw should have a check nut to hold it in position. This plan applies only to weight lathes and of course applicable only to the smaller pulleys.

In fitting up tight and loose pulleys for counter shafts the loose pulley may be smaller in diameter than the tight pulley, as it does not require so tight a belt to drive it, and the strain of the belt is much relieved (especially in short belts) while it is doing no work; saving the wear on the shaft, also saving oil. The belt will shift readily if there is a differ-

increased to about 150 cars per day, and they can fill orders with the utmost promptness.

PUBLICATIONS.

Books and Reports.

"Laugh and the world laughs with you," and everybody knows the rest of this saying. Some time ago the Excelsior Publishing House, New York, issued "Drummers' Yarns." It was a good thing and was hilariously successful, over 50,000 copies having been sold. Believing that a better thing would beat a good thing all hollow the same house has brought out a "second crop" of "Drummers' Yarns," and it beats the first crop two to one, just as two smiles of any sort beats one. It is better gotten up, has better selected wit, and there is more laugh in the illustrations. Our horse doctor said that the first "crop" contained more dyspepsia cure than a ton of chewing gum, and now he says of the "second crop" dump in another wheel-barrow load of pepsin, and yet the gum is in it.

Dr. C. M. Woodward.

The following announcement has just reached us:

"Professor C. M. Woodward having resigned the position of Dean of the School of Engineering in Washington University, and Professor E. A. Engler having been appointed dean, all letters of inquiry relating to the School of Engineering should be addressed to Professor Engler, and all correspondence in regard to the standing and work of students in the school of engineering should be had with him."

Prof. Woodward's high standing as an educator, and the important work which he has done at Washington University, make the above announcement worthy of more than passing notice. On investigation it was learned that while Prof. Woodward has given up the duties of dean, he retains his connection with the University as professor of mathematics and applied mechanics, and as Director of the Manual Training School.

Prof. Woodward has been connected with Washington University so long, and has been so closely identified with the building up of that great institution, that the people of St. Louis would hardly know what to make of Washington University without him. It is gratifying to know, therefore, that his best efforts will still be devoted to Washington University, and that his interest in engineering education will be as lively and as strong as ever.

Believing that the general public—particularly the friends of Washington University, and of engineering education in general—would be interested to know something of the reasons which led Prof. Woodward to take this action, "The Age of Steel" has secured some further information on the subject.

It was learned that the Professor's principal reason for resigning the office of dean was his desire to give whatever time could be spared from other duties to the preparation of a book on Applied Mechanics, which has always been his favorite subject. He has repeatedly been urged to do this, particularly by his former students who have felt that much of the success attending their professional work has been due to their thorough training in mechanics. There is need of a modern treatise on this subject, and Prof. Woodward can do no better service to engineering education than to put into permanent form the results of his deep study and years of experience. He has long had the preparation of such a book in mind, and has always looked forward to the time when he could lay aside other matters and execute this project under favorable conditions. To be able to do this he was obliged to give up some part of his work, and after long consideration he decided upon the course outlined above. The preparation of such a book will involve great labor and will occupy several years, but the additional time now available for the purpose will enable him to make good progress on it.

The position of dean involves much work of a clerical nature and requires attention to details, which with the growth of the University have absorbed a continually increasing amount of time. These duties have been performed by Prof. Woodward for many years, thoroughly and conscientiously, but it is not surprising that in time they should become burdensome, and that he should some day feel entitled to relief. Those who know Prof. Woodward intimately know that his chief enjoyment in life is in actual teaching, and in the supervision of actual school work, and not in keeping records, writing letters, or administering reprovals, however necessary all of these may be.

It would be difficult to compute what engineering education in the West—particularly St. Louis and Washington University—owes Prof. Woodward. At this time a brief biographical sketch of the man will not be without interest.

Calvin Milton Woodward was born August 25th, 1837, in Fitchburg, Mass. His father was a farmer, a brickmaker and a town officer. The son lived and worked on the farm, attending district and public high schools except during the busy seasons. He taught a country winter school when eighteen years old. Entering Harvard College when nineteen, he graduated in 1860 with the highest honors in mathematics. He took athletics in moderation and was a good oar in the University crew.

He was principal of the Classical High School in Newburyport, Mass., for five years, including a year's absence in the army. Was Captain of Company A, 48th M. V. M., serving one year in Louisiana, assisting at the siege and capture of Port Hud-

son. He came to St. Louis in 1865 as vice-principal of what is now Smith Academy. In 1867 he was made assistant professor of mathematics, in 1869 professor of descriptive geometry, and in 1870 Thayer professor of mathematics and applied mechanics, which last chair he still holds.

During the sickness of Chancellor Chauvenet, and the long interval when there was no Chancellor, the School of Engineering—then called the Polytechnic department—was organized, and started on its career of success. Much of the responsibility for what was done rested on Prof. Woodward. The office of dean was created in 1871, and Prof. Woodward held the office until he resigned the special duties connected with that position a few weeks ago, after 25 years continuous service.

The original plan of the directors of Washington University had been to organize the Polytechnic department in the large O'Fallon—now Wabash—building, on the corner of Seventh and Chestnut Streets. Prof. Woodward vigorously opposed the scheme as there could be no economy in separating the undergraduate classes from those in college. In 1868 the O'Fallon Building was sold to the board of public schools—at a vast sacrifice—and soon after the polytechnic wing of the University Building was erected with a new fourth story over the entire structure.

In the years 1876-1881 Prof. Woodward wrote the History of the St. Louis Bridge. In 1877-9 he served a term in the St. Louis Board of Public Schools. In October, 1880, he was selected by the Merchants Exchange to take the re-enumeration of the city for



DR. C. M. WOODWARD.

the tenth United States census. In 1882 the advanced degree of Ph. D. was conferred upon him by Washington University. He entered the Engineers' Club of St. Louis in 1871, and in 1884 he became its president, and for many years took an active part in its affairs. In 1873 he introduced certain features of shop work into the course of all engineering students at Washington University. This work was gradually extended until, in 1879, he secured the establishment of the Manual Training School as an independent department for the preparatory and general training of boys from 14 to 18 years of age. This school has already graduated over 600 young men, of whom fully 30 per cent have entered upon some form of higher or professional education. He retains the supervision of this school, though he has never done any regular teaching there.

In consideration of his great experience in educational matters, Prof. Woodward was appointed Curator of the University of Missouri, by Gov. Francis in 1891. In 1894 he was elected president of the board, and he still holds that responsible position, being the executive head of that institution.

In April, 1885, by special invitation, Prof. Woodward visited England for the purpose of giving some addresses on education at a conference in Manchester. After the conference he made a tour among the technical schools of England, Scotland, France, Switzerland and Germany. He has been in great demand as a lecturer on manual training throughout the United States ever since 1882 when he first presented the subject at the National Association at Saratoga. He has written two

books on the subject, besides numerous pamphlets. He has had the pleasure of seeing his advanced ideas in manual training—first put into tangible shape in St. Louis—followed by the establishing of similar schools all over the United States.

The new dean, Prof. Edward A. Engler, while a comparatively young man, has had wide training and experience as an educator. For many years he has been closely associated with Prof. Woodward, and has thus had exceptional opportunities and training. He has held for some years the chair of mathematics and descriptive geometry. He is well equipped in every way for the duties which devolve upon the dean, and there is every reason to believe that his work in that position will be as satisfactory as it has been in other fields of University effort. The school of engineering will continue to hold an important position in the renewed and broadened life upon which Washington University is about to enter.

The Practical Value of the Various Metalloids in Cast Iron.*

The iron master of to-day, manipulating the modern blast furnace and improved paraphernalia, backed up by the scientific knowledge of his chemist, sees in the immense piles of ores that lie in his yard great possibilities. The chemist begins the development of the ore. When the constituents and value of each kind of ore have been determined, the furnaceman uses the information in making up the different charges to produce a certain specified grade of metal. An error on the part of the chemist or a mistake made by the furnaceman in combining the ores and their fluxes or a failure to supply enough fuel or admit the air at a proper temperature would cause a failure in producing the grade of metal specified. While a scientific knowledge is essential, a practical application of the same is necessary, which is true not only for the blast furnace, but also in remelting the product in the cupola.

A large number of blast furnaces are run especially to turn out metal for steel makers according to specifications laid down by the steel maker's chemist who knows what grade of metal is necessary for his purpose. A few thousandths of one per cent more or less of certain metalloids will condemn the metal for making steel, but a percentage of phosphorus that would injure it for steel would not be objectionable in gray iron castings. So the grade of metal with this objectionable feature is called "off" or No. 2 Bessemer, and the foundrymen buy it for special castings. There are a few blast furnaces well located with reference to ores and fuel whose managers have taken the trouble to carefully and scientifically investigate the requirements of certain consumers and are meeting successfully their demands, sending out with each car of pig iron an analysis of the metal.

This method is proving satisfactory to both parties, for the foundryman, knowing what he gets, uses it intelligently and he can well afford to pay a premium for such metal. This will compensate the furnaceman for the extra cost of analyzing each car load shipped, especially as it relieves him of further responsibility. Northern blast furnaces running especially on foundry pig, buy their ores here they can get them the cheapest, but they are termed "Lake Superior ores" and for this reason much is claimed for the metal they make, but only to a limited extent are these claims justified.

Southern blast furnaces that are favorably located with reference to fuel and ores are limited to local supplies and for this reason whatever grades of metal they make show more uniformity than in Northern furnaces.

Each section grades its output by fracture, and numbers it from one to six, or from one to three, grading the remainder into forge, mottled or white.

The corresponding numbers of pigs from the Northern and Southern sections do not at all agree as to fracture, neither is there a reliable similarity in the corresponding number of furnaces in either sections.

It is possible for a furnace that uniformly runs on the same ores and fuel, to establish grades and numbers by making first a standard and establishing it by repeated chemical analyses. The granular formation is subject to changes caused by the dif-

*Extracts from a paper read before the Western Foundrymen's Association by Major Malcolm McDowell.

ferent temperatures at which the metal is cast, but these variations, which are the exceptions, can be noted, and runs of this sort kept out of the general output.

There is either ignorance, indifference or carelessness in grading pig iron and shipping the same on orders based on claims made by sales agents as to the analysis of the metal made.

In addition to the different numbers and grades, there has been added another variation which is designated by letters added to numbers, as "No. 2P" or "No. 2X," the full significance of which is known by the "sales agent" only. One of the most unsatisfactory things connected with buying metal by analysis is the card issued giving the analysis of certain brands by numbers which usually does not correspond in the least with the iron delivered.

The great tonnage of pig iron is handled in the market by "agencies." Some of these are directly connected with, or owners of blast furnaces, and it is their business to sell the output. In many cases they make the price, but more frequently it is made by the management of the furnaces which is often influenced by its necessities as well as by the fair legitimate competition of its neighbors.

In the offices of the different agencies are young men who are the "sales agents" on the road representing the different furnaces. They are men with an honest, intelligent appearance and have an easy and agreeable address, with a fund of general information on all subjects, including statistics of iron made and sold in the world, especially in the United States, and more particularly by their firm. They have no scientific or practical knowledge of the making or using of iron. They don't need it. The foundryman has that, and they have the iron to sell, which has a reputation regarding which they are thoroughly posted. Among the many engaged as salesmen are some old veterans that have from experience formulated a "special mix" which usually consists of a variety of brands that they have for sale, in the make up of which is always a generous amount of "softener." This neutralizes any of the inequalities of the various "off" or unknown brands that are in the "mix." If this does not prove satisfactory to the foundryman, the sales agent reduces the amount of salable pig and adds instead more "softener." A salable pig will sell itself. It is the off or unknown brands which tax the salesmanship of the veteran, but it is this man the foundryman is always glad to see. The latter knowing little of the value or influence of the different metalloids in the pig, or what to specify for his work, likes to divide the responsibility of his guesses with the sales agent, and the more he has guessing the larger number there are between whom to divide the responsibility of failure.

Both men see the practical value of a "neutral pig" or "softener," but while it gives a metal that can easily be machined it often becomes spongy and weak just where it should not be, and thus there are constant failures in trying to produce a sound, solid, homogeneous casting that can be easily machined and has a fair measure of strength. The metal fails for the want of some other ingredient to counteract the effect produced by too much "softener."

A "softener" is not a "cure all" for all ills that metal is heir to.

The furnaceman and the foundryman are alike interested in knowing the value of each constituent element composing the pig that is made by one and used by the other, not so much a scientific expression of their value, but a practical demonstration that will enable the one to formulate a specification of his wants that the other may meet the requirements with as much ease and precision as he does the wants of the chemist of the steel-maker.

As a general thing, the foundryman does not know the chemical constituents of a metal that will make a casting for a special purpose. He buys a metal from the furnaceman that the one thinks and the other hopes will make what they want, neither are certain—both are guessing—each holding the other responsible if it fails, both claiming the honor if it succeeds.

There is quite as much anxiety among furnacemen as among foundrymen to know whether there is going to be any "kick coming" when castings are made of a lot of pig iron guaranteed to do a certain work. Out of all this anxiety from "guessing" is evolving a new condition. Here and there foundrymen are adding laboratories to their equipment and

the chemists are learning the value of certain metalloids in making special castings. The furnaceman is expressing a willingness to meet the requirements of the foundryman when he knows what it is he wants.

Furnacemen will learn for what kind of business their natural output is best adapted, and will turn their attention to some special grade and so perfect it; thus their natural advantages will give them the preference, and quality will be quite as much considered as quantity.

Assuming the furnaceman is ready to fill specifications for grades of pig iron that will meet the requirements of the foundryman for his special work, it is then of great importance that the foundryman should know the value of the metalloids that combine with iron, and what should be their proportions to produce a certain grade or kind of casting.

There is, more or less, information scientifically expressed of the nature and relations existing between iron and carbon and the various influences exerted on them by the four different metalloids—silicon, phosphorus, manganese and sulphur. This information is not put in such a practical form as to designate the value of these elements in making up a specification for certain grades of metal.

We know in a general way that silicon in certain proportions does hold carbon in combination and in other proportions uncombines, and eliminates it—that it gives fluidity to molten metal—to a limited extent prevents blow-holes, but under other circumstances promotes segregation and sponginess. It reduces a tendency to shrink or chill and alone does not make a strong casting, but it is one of the most important metalloids that is combined with iron and carbon.

Manganese is equally as important as silicon, though almost directly opposite to it. It intensifies the affinity iron has for carbon, and when melted in its presence picks it up and combines it with the iron. It increases a tendency to shrinkage and chill, closes up the grain and makes it a stronger metal, frees it from blow and pin holes, prevents segregation and sponginess, but makes the metal hard and cold,—short or brittle.

These two metalloids influence the relation between iron and carbon in the opposite direction, and neither by themselves make a desirable casting, but combined in their proper proportions they will give the best metal for a majority of work. Sulphur has little in it to recommend it to the favorable consideration of the foundryman. By some it is claimed as a desirable ingredient in making a chill. It merely makes iron white, and does not improve the chill, only increases its weakness. It is estimated that one atom of sulphur neutralizes ten of silicon, and when manganese is low the metal is divided into gray and white iron assuming some very queer forms of distinct separation. When the manganese is sufficiently high these distinct lines of separation are broken up and the fracture shows a mottled bright gray or white, and the metal is hard, brittle and weak.

A few one thousandths of one per cent of phosphorus will render metal unsuitable for steel making, but will not be objectionable in castings; on the contrary is desirable for most work where fullness and fineness of casting is required, and as its tendency is to reduce shrinkage, it would gain strength by an increase of heat, a very desirable characteristic for many purposes.

In Howe's Metallurgy of Steel, will be found the latest compiled information on the relation of these metalloids when in combination with iron, but there is nothing in that valuable work that gives the foundryman the value of these metalloids so that he may make up a specification for the furnaceman.

The majority of the foundry pig iron made is used in foundries making specialties where the same mold is duplicated, requiring the same metal, day after day and year after year. The conditions are uniform and metal to meet them is no more difficult to obtain than one to meet those requirements exacted by the steel-maker.

The difference between the foundryman and the steel-maker lies in that the latter knows the combinations and limitations of the different metalloids he wants, and the former does not, but when he does he will find plenty of furnaces well located for making his required grade of metal.

It is true, a blast furnace making foundry pig does not in each cast make one grade of metal only,

but frequently make all the numbers from one to six. Neither does the blast furnace running on metal for steel-makers, but the metal that would not meet the specifications would be the exception, and in each case this "off" grade metal from both kinds of furnaces would find sale in the large foundries where no special result is looked for, or in the job foundries whose chief reliance is in the cast scrap of the country to be carried by pig or a softener.

There are various grades of scrap cast iron which have been melted and remelted until they are depleted of all the desirable metalloids and have picked up all the undesirable ones. Much of this is tolerated because it is cheaper than pig iron. Still the iron in the scrap is equally as good as the iron in the pig metal and all it requires is to be revived, and any kind of casting can be made out of the scrap that it is possible to produce from the best grades of pig iron, providing the foundryman knows the practical value of the different metalloids.

Nearly every foundryman has at times made an exceptional metal, but how he did it he does not know, nor has he ever since been able to reproduce it. Others have, by experimenting with different brands of pig iron, produced an exceptional metal, and as long as they were sure of the same pig they duplicated it. But what special metalloids acted in combination with the iron they were unable to tell, and are no better off than the Ordnance Department of the United States Army is to-day as to what metalloid there is in "gun metal" that makes it what it is.

Back in the "fifties" the United States Government made an appropriation for the Ordnance Department to experiment with reference to making a metal for cannon. Captain Rodman was detailed to do this and in July, 1856, he made the first heat. Preliminary heats were made to find the best pig metal to use in their mixture. They tried most all of the brands of charcoal pig then made, and selected a combination of "Greenwood" and "Salisbury" which were charged in the hot-air furnace, melted and cast into a pig and this pig was again melted and cast into the gun. In their first heat the metal remained in the furnace over five hours, becoming, as Captain Rodman says, decarbonized and the test bar showed a tensile strength of from 38,000 pounds to 40,000 pounds, but was cold-short and brittle and was condemned. Subsequent heats brought the tensile strength below 36,000 pounds and 33,000 pounds, which proved satisfactory, as the metal showed more elasticity.

The pig used was cold blast charcoal, the chemical analysis of which was not given nor was there analysis of the resultant heats, but there was a marked difference shown by the physical tests.

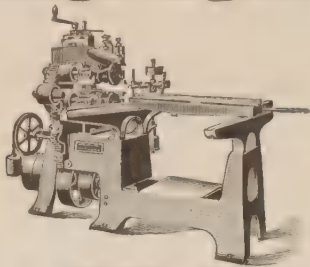
Captain Rodman claimed the "cold-short" heat of high tensile strength was decarbonized, but what the carbon or any of the other constituents were in the metal, is not recorded, nor is there any record of a chemical analysis of the metal at any of the stages of these experiments. What it was or what it lacked chemically, that made one specimen test stronger than another but cold-short is not known.

If the United States Ordnance Department knows no more now than they did when Rodman formulated the specification for castings calling for "gun metal," defined as a charcoal pig metal melted in a hot-air furnace, they should be as interested in knowing the practical value of the metalloids that combine with iron in making special castings as the furnace or foundryman.

Failing to find records to give what is needed, and knowing from my own experience the great value of a knowledge of the relations which exist between different metalloids and iron in making castings, I think it would be advisable to make a series of experiments to determine these relations and their relative values.

I would use a cupola that would melt 1,000 pounds, an hour, taking 250 pounds on the bed, tapping the latter amount into a ladle of that capacity from which I will take the tests necessary. Charcoal should be used as fuel until the desired metal is found, and then coke or anthracite coal used to determine their effect on the standard. * * *

The Junction Iron and Steel Company, Mingo Junction, O., has recently made necessary changes in its tin plate bar mill by which it is able to roll flats from 3 $\frac{1}{4}$ to 7 $\frac{1}{2}$ inches by $\frac{1}{4}$ -inch to 1 $\frac{1}{2}$ inches thick.



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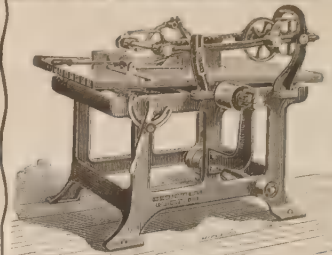
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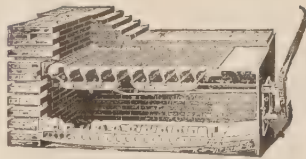
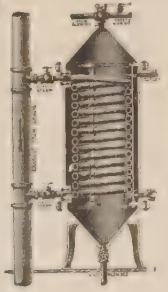
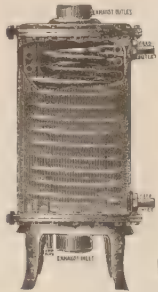
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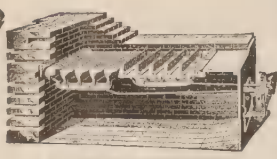
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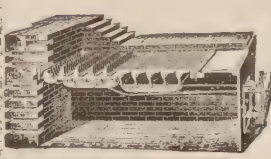


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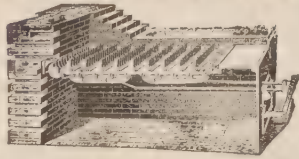
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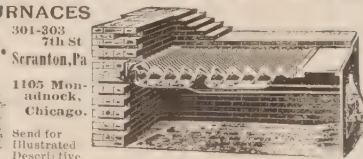
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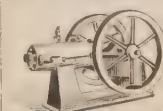
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The Van Duzen Gasoline Engine Co
Cincinnati, O

The L. & I. J. WHITE CO., Manufacturers MACHINE KNIVES

Of Every Description



GOODSELL'S PACKINGS.

Goodsell's Rubber Back Flax.

Goodsell's Dollar Packing.

Special Hydraulic Plain Square.

Special Hydraulic Rubber Back.

ALL STYLES FREE FROM GREASE OR OIL.
BOILING GREASE KILLS FIBRE.
HIGHEST GRADE OF MATERIALS.



Goodsell's Packing Machine.

THE GOODSSELL PACKING CO.
15 WEST LAKE ST.
CHICAGO, ILL.

ST. LOUIS AND VICINITY.

Work is progressing rapidly on the new shot tower at Granite City.

John Krey & Son are contemplating adding an ice machine to their plant; probably 8 or 10 tons capacity will meet their requirements.

The St. Louis Stamping Company at Granite City, Ill., are going to put on a double force of hands, and will operate their plant day and night.

The American Steel Foundry, at Granite City, Ill., is working with a full force of hands. The company has orders enough on its books to keep the works busy for a long time.

The Moon Elevator Company are running their forces on old contracts largely, but are doing considerable figuring and expect to have a plenitude of work in the course of the next two or three months.

A. B. Hazzard has received the order for the 400 horse power "Cookson" heater for the Chemical Building, Eighth and Olive Streets. This will be the first of the large heaters of this make placed in St. Louis. With its large heating capacity great results are looked for.

The Granite City (Ill.) Steel Works are closed down in all departments. They expect to resume operations on Monday, August 3d. The company has put down a larger plate mill. The rolls are 84 inches long and 28 inches in diameter, and have been rolling sheets 18 feet long by 6 feet wide.

J. H. Taylor & Co. is the title of a new firm of railway brokers, with offices in the Wainwright Building. The members of the firm are experts in railway building and management, and their experience will be of great value to all contemplating railroad construction and the purchase of the necessary equipment.

There is enough work on the books of the John O'Brien Boiler Works Company to keep them fairly busy, but they jestingly remark that while their orders are scattered all over the country, there does not seem to be enough business in the Western country to keep their constantly increasing plant running to its fullest capacity.

The Joseph F. Wangler Boilers and Sheet Iron Works Company are having a good-sized run of orders in their sheet iron department and are just about finishing up on the rush of work caused by the cyclone. Among other boilers they are furnishing for local parties are those for the Lindell Hotel, the Strauss Millinery Company, the Great Western Planing Mill Company, and two boilers for the Union Car Company in Baden.

After the 1st of August, Col. Henry M. Fife, local agent for the J. H. McGowan Company, steam pumps and tobacco machinery, as well as other mechanical specialties, will remove his headquarters from the present location on South Third Street to No. 623 North Main Street, in the same building with the St. Louis Steel Wire Brush Company. Mr. Fife is working hard in this territory introducing his various lines of goods, and is meeting with considerable success in his efforts.

S. E. Flint, local representative of Russell & Co., has secured several contracts recently, a few of them being a 150 horse power four-valve engine, with complete steam plant, to Helena, Ark.; a 150 horse power four-valve engine to parties at Benton, Mo.; 150 horse power engine to Worthington, Ind.; two direct connected engines to Westinghouse generators—one 115 horse power and one 60 horse power—to the Lindell estate for buildings on Washington Avenue, and a 100 horse power four-valve engine and complete steam plant to D. S. Hooker, a Texas patron of the company.

L. D. Kingsland, agent for all goods formerly made and all patents and patterns owned by the Kingsland & Douglas Manufacturing Company, reports a good demand for their ginning machinery, with an improving call for nearly all their lines of manufacture. Mr. Kingsland has issued a circular, with the following announcement: "We take pleasure in informing you that we are in position to promptly supply all repairs and general supplies that may be needed for machinery that was manufactured by Kingsland & Douglas Manufacturing Company for the past fifty-two years. We would also be glad to be favored with any orders you may have in our line, and will give special inducements

in the shape of prices to parties who wish to buy on a cash basis. We are compelled to sell in this way, but hope to more than recompense our friends and customers by giving them low figures. We will appreciate, more than we can express to you, any orders you may feel disposed to favor us with, as we need them now more than ever, and shall try to give entire satisfaction to those who favor us with their orders."

The Moses P. Johnson Machinery Company are having an excellent business for the season and report the prospects as decidedly encouraging. Their recent sales include two 100 horse power boilers for the new sand dredge built by Messrs. Kavanaugh & Lockwood; three large firebox marine boilers for the new towboat of the Mississippi & Bonne Terre Transportation Company, which is to be fitted with compound engines, making the most economical steamboat on the river; rock drills to the M. M. Buck Manufacturing Company; engine, boiler and pump for flour mill to Devol & Scott, Steelville, Mo., and the entire electrical equipment of the Eureka Springs (Ark.) Electric Street Railway Company.

Last week we published the incorporation of the Charter Oak Stove and Range Company, of which Alvah Mansur is president; G. D. Dana, vice-president and general manager; L. D. Vogel, secretary, and Theo. A. Hammond, treasurer. Since then active work has been begun, Charter Oak stoves now being turned out by the company at the old Excelsior foundry on North Main Street. Messrs. Mansur and Tebbetts are well-known as members of the Mansur-Tebbetts Implement Company. Mr. Dana, the vice-president and general manager, is a Charter Oak man of long standing, having been secretary of the Excelsior Manufacturing Company for the last fifteen years, and several times elected president of the National Stove Manufacturers Association. Mr. Vogel, the secretary, was twenty-eight years with the Excelsior Company, and for several years previous to its embarrassment was assistant secretary. The treasurer, Mr. Hammond, was assistant treasurer of the Excelsior and spent twenty-five years of his life in its service. The new company are getting orders at a lively rate for the old favorite "Charter Oak" stoves and range with which their interests have so long been identified, and the indications point to a long and prosperous career under their management.

ELSEWHERE.

Iron and Steel.

It is said that the Bridgeport mill of the Illinois Steel Company will probably not resume operations until September. The Milwaukee mill is still closed.

Over 4000 men, employees of the National Rolling Mill, McKeesport, Pa., have been granted the Amalgamated scale, and all the mills of the company it is expected, will soon be at work double time. The scale price is based on an increase for puddling from \$4 to \$4.50. The increase to puddlers raises the wages for helpers correspondingly.

At Anniston, Ala., a strike has occurred among 300 puddlers, heaters and rollers in the rolling mill department of the United States Car Company which threatens to become serious. On July 1st the new wage scale, increasing prices from \$4 to \$4.50 per ton, went into effect. The company agreed to pay the new scale, but did not sign it, and the men claim, they held back 2 per cent of their wages for an insurance fund. The company have given discharge notices and say the strikers are forever barred from the mill.

The LaBelle Iron Company, Wheeling, will in a few days be in a position to use gas in all of the departments of their plant. The change from coal to gas as fuel has been rumored on the South Side for the past month but not until a day or so ago was there any action on the part of the company indicating a change. Now a force of men are at work making the alterations at the furnaces. The LaBelle Company is the second to make the change, the Whitaker Iron Company abandoning the use of coal several weeks ago.

Harriman (Tenn.) Daily Advocate, July 21st: Chancellor Lindsay has granted an order of sale of the rolling mill upon the petition of the general creditors, who are represented by McKenzie & Carr. The date of the sale is December 12th, which

CHARLES NIEKAMP.
Pres't and Treas.

HENRY SPECK.
Vice-Pres't and Sec

GLOBE FILE & IRON CO.,

—DEALERS IN—

HEAVY HARDWARE,

WAGON AND CARRIAGE BUILDERS' SUPPLIES.

GRINDSTONES OF ALL SIZES.

RECUTTING OF OLD FILES A SPECIALTY.

802 North Second Street,

ST. LOUIS, MO.

JOHN COLES & CO., NAILS

MANUFACTURERS' AGENTS.

—LAKEDE BUILDING.—

ST. LOUIS, MO. WIRE IRON.

HOYT METAL COMPANY

OWNERS AND MANUFACTURERS OF THE

FAULTLESS

METALLIC

PACKING

—FOR—

PISTON

RODS,

VALVE

STEMS

and PUMPS.



THE BEST

AND

CHEAPEST

PACKING

ON THE

MARKET.

SENT ON 30

DAYS TRIAL.

Satisfaction

Guaranteed.

Office and Factory, WABASH TRACKS AND BOYLE AVE.,

ST. LOUIS, MO.

THE COOK WELL CO.

ST. LOUIS, MO., U. S. A.

Cook's System of Wells for Cities, Towns, Villages, Railroads, Ice Plants, Breweries and Manufacturers.

COOK'S PATENT BRASS TUBE WELL STRAINER. COOK'S DEEP WELL PUMPING ENGINES.

ESTIMATES FURNISHED UPON APPLICATION. WRITE FOR CATALOGUE AND PRICES.

MUST ON BRIGHT METAL SURFACES IS ABSOLUTELY PREVENTED BY USING

MANNOCITIN

THIS SLUSHING COMPOUND IS USED & ENDORSED BY LEADING FIRMS



IN AMERICA & EUROPE. WRITE FOR SAMPLE & PAMPHLET. OTTO GOETZE, MFRS. REPRESENTATIVE 114 BROAD ST., N. Y. CHAS. H. BESLEY & CO., CHICAGO AGENTS. SIMMONS HARDWARE CO., ST. LOUIS AGENTS.

Eclipse Shoe Stands and Lasts

REVERSIBLE AND COMMON SHOE LASTS, LAP LASTS, SHOE RESTS, SHOE HAMMERS, Etc., Etc.



Patented May 1st, 1894.

FOR PRICES AND CIRCULARS ADDRESS

JOHN C. KUPFERLE, St. Louis, Mo.

will be in time for confirmation at the January term. It is understood, of course, that the sale is in pursuance of a plan to get the property into "friendly hands," and be owned by men who will operate it, instead of keeping the rolls idle in order to benefit mills elsewhere.

Iron Age: The Pittsburg Wire Works of Pittsburg, Pa., with works at Braddock, Pa., have declared a dividend of 6 per cent for the year 1895-1896. The company propose to make some further extensions and improvements on the strength of their increasing trade. Alexander Dempster, who resigned as president of the concern on account of heavy business interests elsewhere, has been succeeded in that office by Willis F. McCook. Thomas W. Fitch is secretary of the company, O. H. Powers general manager and Thomas Walker treasurer. The plant resumed operations on Monday, the 13th, with 700 men.

Machinery.

American Manufacturer: The W. T. Adams Machine Company, of Corinth, Miss., has purchased the plant of the Milburn Gin and Machine Company, at Memphis, which is said to have cost \$400,000 when first built. The Adams Company will remove its Corinth plant to Memphis and consolidate the two plants.

The Rhode Island Locomotive Works, Providence, R. I., having completed all contracts, closed on the 20th inst. for an indefinite period, by order of the committee of its creditors, which controls the concern on a five-year extension from February, 1896. A plan is on foot to reorganize the company with New York and Providence capital.

The new highway bridge across the Connecticut River connecting Middletown with Portland, Conn., is now swung by electricity. The electrical equipment consists of four G. E. 800 motors. Two of these are connected with the swinging mechanism one working and the other being held in reserve. Of the other two, one is located under each end of the turning span, to raise it from the fixed piers before the third motor begins to swing it. The bridge span is 450 feet long—the longest single span highway bridge in the world. Previous to the installation of this electrical equipment by the General Electric Company, fifteen men were required to start the bridge and eight men to swing it.

To-day (July 25th) the Penberthy Injector Company, Detroit, Mich., are celebrating the event of the manufacture and sale of 100,000 Penberthy injectors during a period of ten years, extending from June 5th, 1886, to May 12th, 1896, by giving their employees a holiday and excursion, in which their friends and customers are also participating. The steamer "Sappho" left the foot of Woodward Avenue at 8:30 a. m., to return at 6 p. m., spending three hours at "Beauvoir," St. Clair River, where refreshments will be bounteously served. Music, games, etc., are also on the programme. We regret that we are not one of the party; but in all earnestness we wish the Penberthy Company "many returns of the day."

The J. H. McEwen Manufacturing Company, 23 Dey Street, New York City, report the following sales for the month of June: Dynamos 60 K. W. belted and 100 K. W. direct connected to 16 x 16 McEwen engine to Jeffrey Manufacturing Company, Columbus, O.; 50 K. W. and 100 K. W. direct connected to 12 x 12 and 15 x 16 McEwen engines to Bissell, Dodge & Erner Co., Toledo, O.; 100 K. W. and 150 K. W. belted machines to Link Belt Machinery Company, Chicago; 30 K. W. belted to Jeffrey Manufacturing Company, Columbus, O.; 25 K. W. belted to New York Safety Insulated Wire Company, New York; 200 K. W. D. C. to McEwen tandem compound engines and 400 K. W. D. C. to McEwen tandem compound engines to Tacony and Frankfort Electric Railway Company, Tacony, Pa. This is the second order by this company, the first having been for two 200 K. W. direct connected generators to McEwen tandem compound engines. Engines—9 x 10 to W. M. Johnson & Co., Chicago; 9 x 10 to Elk Tanning Company, Philadelphia; 13 x 14 to Jeffrey Manufacturing Company, Columbus, O.; 13 x 14 to Scranton Electric Construction Company, Scranton, Pa.; 9 x 10 to Jeffrey Manufacturing Company, Columbus, O.

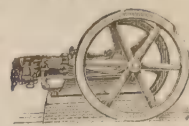
The Hazelton Boiler Company, New York City, report recent sales of boilers, aggregating 2450 horse power as follows: The Rochester Gas and Electric Company, Rochester, New York, 500 horse

THE LAMBERT GAS AND GASOLINE ENGINES.

STATIONARY 2 TO 50 HORSE POWER. PORTABLE 2 TO 25 HORSE POWER.
Simple, Strong, Durable, Satisfactory. Adapted to all Kinds of Duty.

Purchaser runs — risk in buying the LAMBERT.
A Practical Power for Economical People.
An Economical Power for Practical People.

Catalogues and
Prices
On Application



LAMBERT GAS AND GASOLINE ENGINE COMPANY,
28 KENTUCKY AVENUE, INDIANAPOLIS, IND.
JAS. T. MACKAY, 615 North Second Street, ST. LOUIS AGENT

PRICES WORTHY OF YOUR CONSIDERATION!!!

Write for particulars regarding our latest triumph.

THE "PERFECTION" WELDLESS TWISTED LINK STEEL CHAIN.



Exact size
of the
No. 3.

PATENTED AUGUST 27, 1895.

We are also makers of the celebrated "Triumph" and "Brown" Steel Chains and Specialties, "Monarch" Sash Chain and Plumbers' Chain.

THE BRIDGEPORT CHAIN CO., Manufacturers, BRIDGEPORT, CONN.

power; Lambertville Rubber Company, Lambertville, N. J., 200 horse power; Goodyear Rubber Company, Middletown, Conn., 150 horse power; Bristol Electric Light and Railway Company, Bristol, Conn., 200 horse power; Equitable Gas Light Company, New York, 500 horse power; Pettibone-Cataract Paper Company, Niagara, Falls, N. Y., 250 h. p.; North Adams Gas Light Company, North Adams, Mass., 150 h. p.; Canandaigua Electric Light and Railway Company, Canandaigua, N. Y., 250 horse power and Newton Falls Paper Company, Newton Falls, N. Y., 250 horse power. They have also recently completed contracts with the Cape-well Horse Nail Company, Hartford, Conn., and Messrs. P. & F. Corbin, New Britain, Conn. The above company reports that nearly all of their orders now being received are for the very earliest possible delivery, and that many of their recent sales have been made to old customers, who are now enlarging their plants. The original boilers sold to these customers have been in constant operation for eight to ten years, without repairs, still carrying high pressure, and giving the same fine results as when new. This, together with the fact that the Hazelton Company has made various improvements in the construction and setting of their boilers, increasing their efficiency and economy, and improving their appearance, makes it much easier for them to make sales now than formerly.

Hardware.

The plant of the Little Rock Fence and Wire Company, Little Rock, Ark., has passed into the hands of the newly organized Little Rock Iron and Wire Company.

F. E. Kohler & Co., hardware specialty manufacturers, Canton, O., are out with a new catalogue of curry comb specialties—the flexible back, the magic oscillating curry comb, the "Humane" and the all steel "shingle back" curry combs.

Miscellaneous.

The Anheuser-Busch Brewing Association, of St. Louis, Mo., has purchased an 80 x 190-foot site at Baltimore and will erect thereon a bottle and storage-house, to cost from \$100,000 to \$150,000.

The Souvenir Sugar Refinery, three miles from Donaldsonville, La., was destroyed by fire about 3 o'clock July 19th. Several hundred-barrels of sugar and many tanks of molasses were also destroyed. The loss is about \$15,000. The Souvenir is owned by Mr. Lem Goldchaux, of that city, and is one of the finest sugar plantations in the State. The fire was undoubtedly incendiary.

A telegram from New York, on July 17th, says: The diamond trust has made another advance in prices. Cecil Rhodes, Barney Barnato, Abraham Abrahams, J. B. Robinson, Berner, Welt & Co. and Joseph Bros., who control the diamond trust, have declared that prices must advance. The New York jobbers received notice a few days ago. These Englishmen and South Africans have absolute control of the diamond output of the world. The last advance which the New York jobbers are informed that they must pay is 82c a carat. This means an additional profit of \$2,000,000 a year to the trust.

William Fraser, of Taos County, New Mexico, on July 21st, sold to an English syndicate his group of gold and copper mines in Amizett mining district for \$125,000. The transaction was closed by Thomas B. Gillispie, of London, who paid \$100,000 in cash, the remainder to be paid in stock. On that date a mining company and a company formed to treat ores in that district filed articles of incorporation with the Territorial Secretary, the combined capital stock being \$7,000,000. The mines are very rich and have yielded gold for ten years. Associated with Mr. Gillispie are William B. Cameron, a resident of Taos, N. M., and Wilbur F. Smith of Oregon.

CHARTERED AND PROJECTED.

ALABAMA.

A water system to cost about \$15,000 is in contemplation at Athens. Mayor McClellan will answer all inquiries.

ARKANSAS.

Marianna Gin and Manufacturing Company, Little Rock; capital, \$15,000. Incorporators and officers—H. S. Mixon, president; C. T. Ward, vice-president; O. Card Sutton, secretary; J. A. Plummer, treasurer; A. S. Sutton, H. P. Davis and F. D. Plummer.

KANSAS.

The Wiles & Winter Hardware Company, Cherokee, Crawford County; capital, \$15,000. Directors—T. G. Wiles, of Kansas City, and W. T. Winter, of Cherokee.

LOUISIANA.

Schwartz Foundry Company, Limited, New Orleans; capital, \$2,000,000. Incorporators and directors—Moses Swartz, Wm. Adler, Michael G. Weil, Sidney Bradford and Alfred Jordet.

MISSOURI.

Campbell Iron Company, St. Louis; capital, \$60,000.

The Taylor Construction Company, Kansas City; capital, \$2500. Incorporators—James E., John W. and Wm. W. Taylor.

O'Fallon Coal Mining Company, St. Louis; capital, \$10,000. Incorporators—H. C. Kohler, E. R. Johnson and William Kombrink.

NEW YORK.

The Charles G. Howe Exporters and Consumers Flour Company, New York City; capital, \$5,000,000. This company purposes manufacturing and selling direct to the wholesale consumers and retailers, foreign and domestic, at the lowest prices the market affords, thereby saving purchasers the profit of middlemen, as is constantly being done in other branches of commerce. The company intend erecting in the near future, in the heart of the wheat growing section of the West, spring and winter wheat mills of a daily capacity of 20,000 and 10,000 barrels respectively; collectively the largest plants in the world, with facilities to increase same, as demands require. The elevators, buildings, power, machinery, etc., will be of the very latest improvements that skill and experience command. The principal offices are at Nos. 21 to 24 Stat

The American Improved Anti-Friction METAL COMPANY.

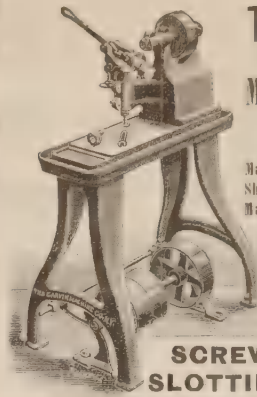
Manufacturers of the best metal for journal bearings of any kind—especially for Steamships, Railroad and Street Cars, Sugar Mills, Rolling Mills, etc. Especially adapted to high speed journals. This metal is warranted not to HEAT OR CUT the journals, and its lasting qualities make it superior to any other metal. Its excellence makes it the most economical metal.



It is self-lubricating.
It is tougher and more durable than all other metals.
It is the best metal known where great pressure is required.
It runs with less friction than any other metal.
It will stand the highest rate of speed and will not heat or cut.

In General Use Everywhere and gives Universal Satisfaction.
Office and Works, Mobile, Ala. Agencies in all the Principal Cities.

For Sale by RUMSEY & FARMER CO., St. Louis, Mo.



SCREW SLOTTING MACHINE. Spring and Varick Sts., NEW YORK.
51 North 7th St., PHILADELPHIA, PA.

The GARVIN MACHINE CO., MAKERS OF AND DEALERS IN METAL-WORKING MACHINERY OF EVERY KIND.

Universal and Plain Milling Machines, Drill Presses, Screw Machines, Hand and Engine Lathes, Planers, Turret Lathes, Shapers, Gear Cutters, Die and Cutter Grinders, Tapping Machines, etc., etc.

A COMPLETE LINE OF
Special Bicycle Machinery.

Write for catalogues and list of new and second-hand machinery for immediate delivery.

Street, (Chesebrough Building), Warehouse at No. 46 Front Street, New York City.

PENNSYLVANIA.

The contract will soon be let for the erection of the largest by-product coke plant in the United States, to be located at McKeesport, adjoining the National Tube Works. The capital to be invested will be about \$1,000,000, which is being furnished by the Union Gas Company, of Philadelphia. Forty acres of ground have been leased near the tube works, involving the tearing down of more than 100 dwellings. It is intended to erect 120 Otto Hoffman by-product coke ovens on this property. The advantage of these ovens will be appreciated when it is stated that the coke costs practically nothing, as the money made in the saving of the by-products will pay for the burning of the coke.

SOUTH CAROLINA.

The Simpsonville Oil Manufacturing Company, Simpsonville; capital, \$10,000. Incorporators—T. R. Cox, J. H. Todd, F. D. Hunter and others.

The Columbia Water Power Company, Columbia, has increased its capital stock from \$600,000 to \$1,000,000.

Beaufort Water Works Company, Beaufort; capital, \$25,000.

TENNESSEE.

A new mine has been opened at Crooked Fork by the Crooked Fork Coal Company.

TEXAS.

The bridge to be built by the Kansas City, Pittsburg & Gulf Railroad over the Neches River, at Beaumont, Tex., will be one of the largest in the Southwest. It will have an iron draw, with trestle approaches on either side. The total length of the structure will be two miles, and it will cost about \$100,000.

Shiver Oil Mill Manufacturing Company, Shiver; capital, \$20,000. Directors—E. F. Wolters, William Green, John Valenta, August Stephan and J. E. Maslin.

WEST VIRGINIA.

Mr. J. W. Breen has sold for Pittsburg parties 300 acres of land, river and railroad front, near Cherry Run Station, B. & O. R. R., Berkeley county, W. Va., to a prominent capitalist of Kenosha, Wis., with a view of establishing Swedish colony furniture and canning factories. The land between the railroad and river is specially adapted for manufacturing plants. Mr. Breen is also negotiating with Pittsburg manufacturers, steel and patent glass bottle makers who are desirous of getting nearer to tide-water and cheaper raw material and labor. The recent anthracite coal development near Cherry Run and the canal and railroad facilities, coupled with low freight to all the large markets, renders this locality especially attractive.

The business interests of Morgantown, W. Va., received an impetus a short time ago when a glass factory, now doing business at Fostoria, O., was secured for that place. A deal has been pending for some time between the Seneca Glass Company, of Fostoria, and the Morgantown Building and Investment Company, and the latter succeeded in raising the \$20,000 guarantee demanded by the glass concern. This was accomplished by the sale of 200 lots on the Morgantown addition. The Glass Com-

pany pledged themselves to employ 250 workmen and distribute wages of \$100,000 a year. The removal of the employees to Morgantown will mean an increase in population of 1,000. Failure of gas supply around Fostoria is the cause of removal.

Meeting of Pig Iron People.

Philadelphia, Pa., July 15th: A meeting of pig iron men was held to-day at the office of the Lehigh Coal and Iron Company. The call for the meeting was sent out by George Brooks, of Pottstown, a large pig iron producer. Beyond that fact little of the meeting is known except by those who were present, and they persistently refuse to give out any information concerning the discussion or the business transacted.

The representation, however, was not large. There were present three representatives of the Tennessee Coal, Iron and Railroad Company, the Thomas Iron Company. The Tennessee corporation has thirteen furnaces in Alabama and four in Tennessee. The Thomas Company has ten furnaces in Pennsylvania, and is regarded as one of the most important producers in this State. What other companies were represented at the meeting could not be learned.

The condition of the trade, its cause and plans for the relief were discussed and talked over in a friendly way, but nothing definite was done to-day, and another meeting will be held at some future time, when an endeavor will be made to secure a larger attendance. The chief object in view was to devise means for regulating the production and prices of pig iron.

An Electric Street Cleaner.

The Tradesman: An electric self-loading car has been patented, which bids fair to work a revolution in the method of cleaning the streets of large cities. It runs seven miles an hour, cleaning the whole street except a narrow strip at the sides, from which the dirt is swept toward the tracks by the usual horse brooms, and it not only sweeps up the dust, but conveys it outside the city, thus saving the labor of hundreds of men and horses. The car is twenty-two feet long, and is fitted with the usual trolley equipment, although the brakes, motors, etc., are all placed above the wheels and axles, so as not to impede the action of the brush. The operating platform on which the hands stand while directing the movements of the car and broom is so placed as to protect them from the dust thrown by the revolving brush. This brush, which makes five revolutions to each one of the car wheels, works much on the principle of a carpet sweeper. It is capable of throwing the dust a distance of twenty-five feet, and will pick up thirty-eight car loads without stopping. The broom acts as well one way as another, steel deflectors being so arranged that it can be run backward without any change of machinery. The action may be reversed instantly, so as to throw the dust one way or the other, as may be desired. The broom may be extended so as to cover the whole street if necessary. For removing snow the car may be constructed long or wide, according to requirement. The car can be unloaded in thirty seconds, one man doing the whole work by lever. It is stated that the work of this machine averages less than \$1 per mile.

THE CARE AND MANAGEMENT OF

GAS & OIL ENGINES.

BY G. LIECKFELD, C.E.

TRANSLATED WITH PERMISSION OF THE AUTHOR BY
GEO. RICHMOND, M.E.

To which has been added full directions for the running of

OIL ENGINES.

CONTENTS:

Choosing and installing gas engine. Construction of good gas engines. Economy. Reliability. Cost of installing. Proper erection. Construction of the foundation. Gas pipes. Rubber bag. Locking device. Exhaust pipes. Air pipes. Setting up gas engines. Brakes and their use in ascertaining the power. Arrangement of the brake test—attendance on. Gas engine oil. Cylinder lubricators. Rules as to starting and stopping. Cleaning. Examination for defects. The engine refuses to work. Non-starting of the engine. Difficulty in starting the engine. Unexpected stopping of engine. Irregular running. Loss of power. Knocking and pounding. Dangers and precautionary measures in handling gas engines. Oil Engines. Gas engines with producer gas. Gasoline and oil engines. Failure to start. Examination of engine in detail. Vaporizer valve box. Directions for management of oil engines. 16 pages, illustrated. 12mo., cloth, \$1. Sent on receipt of price. Address,

The Age of Steel,
Equitable Building, ST. LOUIS, MO.

Inside Facts

Most wheelmen know a little about mechanics. They ought to know more. They ought to know all the inside facts about the machine they are riding.

A bicycle is a delicately adjusted piece of mechanism. The rider who knows all about his wheel will not have much use for the man who does repairs. He will spend precious little money for repairs, adjustments and "what not."

Every wheelman ought to read **Lord's Power and Machinery Magazine**. It is devoted to Mechanics, Engineering and Machinery. It is full of facts, opinions and theories from the world's best writers on the subjects to which it is devoted.

Published monthly at \$1 a year. No wheelman can possibly read it a year without getting more than a dollar's worth of information. Sample copy sent for 10 cents. Write to us.

GUILD & LORD

617 Atlantic Ave., Boston, Mass.

J. W. BRANNING,
Pres. and Treas.

FRANK B. DELAPLAINE,
Secretary

OFFICE OF

THE BRANNING MANUFACTURING CO.,

Manufacturers of Carolina Pine Lumber.

Kiln dried, dressed and undressed

EXTOWN, N. C., January 23, 1904.

JOHN P. STONE, Philadelphia, Pa.

DEAR SIR: Enclosed find check for Heater. We got it started last week and find it all you claim and are well pleased with it. We shall want another heater for our new mill. The engine in that is 25x35, turns 100 and has a 9-inch exhaust. Want to feed three boilers, 72x16 tubulars. What will it cost?

Yours truly, J. W. BRANNING, President

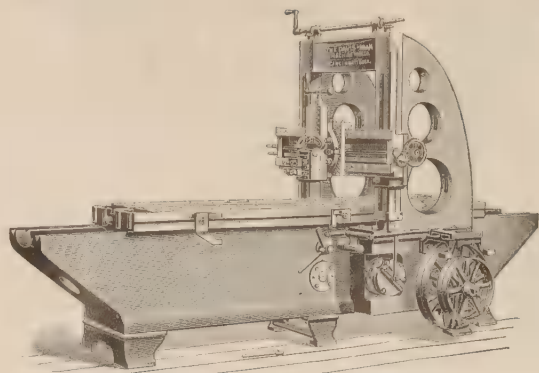
JOHN P. STONE

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Of the South are attracting, and will continue to attract much attention. Once moistened by patriotic blood, and made historic by the heroic deeds of American manhood and chivalry, they will always remain as sacred ground. When you go South, it would be well to bear in mind that more than fifty famous battles occurred on and near to the line of the Nashville, Chattanooga & St. Louis Railway, forming almost a continuous battle ground from Nashville, Tenn., to Atlanta, Ga. The "Dixie Flyer" train, leaving Nashville at 7:30 a. m., daily, carrying through Pullman sleepers to Jacksonville, Fla., by Chattanooga, Atlanta, Macon, Lake City, gives daylight ride through the picturesque mountains and old battle fields of Tennessee and Georgia. Berths can be secured through from St. Louis and Chicago Address R. C. Cowardin, Western Passenger Agent 120 Laclede Building, St. Louis, Mo.

The Florida Season

is now fully opened up, and the question of when to start and by what lines to travel is presenting itself to the Southern tourist. A pleasing choice of route is an essential feature of a railway trip.

The Cincinnati, Hamilton and Dayton Railway, with solid trains, magnificent sleeping and parlor car service, quick schedules and close Cincinnati connections with the fast lines to Florida, realizes all the possibilities of modern journeying. Any of the company's agents will, on call or written application, be pleased to give full information as to rates, etc.; supply you with a full line of printed matter, and render all services necessary to a satisfactory trip.

George W. Hayler, D. P. A., Indianapolis, Ind.; J. S. Leahy, G. T. P. A., Chicago, Ill.; W. H. Whitteley, C. P. A., Dayton, O.; J. C. Winans, D. P. A., Piqua, O.; John Bastable, D. P. A., Toledo, O.; D. B. Tracey, N. P. A., Detroit.

D. G. EDWARDS, G. P. A.,
Cincinnati, O.

Some of our friends in the South and West are already thinking about a little vacation for themselves and families this summer. To all such we have a word of advice. Send your name to James C. Pond, G. P. A. Wisconsin Central Lines, Milwaukee, Wis., and ask him for a copy of "The Summer," a little book full of elegant pictures, maps and information about the resorts along that line. No where in the North will you find more delightful, restful or beautiful places than Burlington, Wis., Lake Kenilab, Waukesha, Neenah, or the Chain of Lakes, near Waupaca. Of the latter place the writer cannot speak too highly. But send for a copy of the book mentioned and you will get all the information desired.

Plan Your Summer Outing Now. Go to Picturesque Mackinac via the Coast Line.

It only costs \$13.50 from Detroit, \$15.50 from Toledo, \$18.00 from Cleveland for the round trip, including meals and berth. One thousand miles of lake ride on new modern steel steamers for the above rates. Send 2c. for illustrated pamphlet. Address A. A. SCHANTZ, G. P. A., Detroit, Mich.

Clover Leaf St. Louis-Indianapolis Line—Two Trains Daily.

Commencing Nov. 24th, the Clover Leaf will run through parlor cars and sleepers daily between St. Louis Union Station and Indianapolis Union Station.

Meals served en route a La Carte. Trains leave St. Louis 7:44 a. m., (except Sunday) and 7:01 p. m., daily from Indianapolis 8:30 a. m. (except Sunday) and 11:15 p. m., daily. For further particulars see nearest ticket agent of Clover Leaf Route or the I. D. & W. Ry., C. C. Jenkins, Gen'l Pass. Agt., Toledo, Ohio.

First-Class Steamboat Service Between Detroit and Cleveland, and Cleveland, Put-in-Bay and Toledo.

D. & C. Floating Palaces are now running daily between Detroit and Cleveland, and on May 1 will commence to run daily between Cleveland, Put-in-Bay and Toledo. If you are traveling between the above points take advantage of a water trip and save money.

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Their new steel passenger steamers are all in commission, making four trips per week between Toledo, Detroit, Mackinac, Soo, Petoskey and Duluth. If you are contemplating a summer outing, send 2c stamp for illustrated pamphlet. Address

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To those who contemplate taking a summer outing, we will mail for 2c postage our illustrated pamphlet, which contains a large number of fine engravings of every summer resort between Cleveland, Toledo, Detroit and Picturesque Mackinac. It has many artistic half tones of points of interest of the Upper Lake region. Information regarding both short and extended tours, costs of transportation and hotel fare, etc. Address,

A. A. SCHANTZ, G. P. A.,
Detroit, Mich.

Patents Issued During the Past Week.

The Age of Steel Patent Soliciting Agency, Messrs. Keller & Starek, attorneys, report the following list of patents granted Southwestern inventors and manufacturers. We furnish free of charge pamphlets and circulars to those desiring to obtain patents.

Ore Mill—Samuel K. Behrend and C. F. Weller, Washington, D. C.

Bicycle Alarm—Wm. M. Brevard, W. B. Orr, and J. W. Solge, Macon, Ga.

Wire Stretcher—David H. Folk, Brewer, Tex.

Bicycle Support—Robert Holmes, Canyon, Colo.

Rotary Engine—Carl A. and O. W. Hult, Stockholm, Sweden.

Street Sweeper—Henry Mueller, Jr., St. Louis, Mo.

Air Compressor—La Verne W. Noyes, Chicago, Ill.

Bicycle Handle Bar—Victor E. Rumbarger, assignor of one-half to H. G. Brotsman, Dayton, O.

Roller Bearing—Robert Scharle, Aurora, Ill.

Flue Stop—Rodney C. Skinner, Forest, Ill.

Steam Bake Oven—Adam Spangler, Silverton, Ore.

Gas Apparatus—L. V. Stevens, Trenton, N. J.

Slide Bar for Boiler or Other Level Grate Furnaces—Jerome W. Wetmore, Erie, Pa.

A printed copy of the specification and drawing of any patent in the foregoing list will be furnished from this office for 25 cents. In ordering, remit to of Age Steel patent department.

Judge Simonton has appointed Arthur King receiver for the Middletown Car Works. Mr. King is the principal owner of the concern. In the bill of complaint filed by creditors it was stated that there are claims against the works of \$57,673 and that the value of the plant and material is about \$118,000, with a considerable number of orders on hand. It was agreed by all parties interested that the business should proceed under a receivership. Mr. King's bond was fixed at \$32,000. About 200 hands are at present employed at the works.

The Murray Iron Works, of Burlington, Ia., and the Sioux City Engine and Iron Works, of Sioux City, Ia., have recently consummated a deal whereby the Murray Iron Works Company will hereafter build the Sioux City Corliss engine for the territory of the United States east of Des Moines, Ia., and the business west of there will be handled as heretofore, by the Sioux City Engine and Iron Works, under the management of W. M. Thompson, its president.

This move has been made almost necessary by the constantly increasing demand for the Sioux City Corliss in the Eastern and Central States, and the inability of the Sioux City Company to compete with Eastern builders, on account of freight charges.

Burlington, being centrally located, will now give them an opportunity to get into all the Central and Eastern territories, on an equal basis with their competitors.

New shops are about completed at Burlington, and orders from there can be filled by September 1st. These shops are being equipped with new and modern machinery, and much larger engines will be turned out than it has been possible for the Sioux City Company to build. This fact, together with the recognized superiority of the Sioux City Corliss, it is believed, will soon put the business of the Murray Iron Works in Corliss engines in the Central and Eastern States, in the same enviable position held for some years by the Sioux City Engine and Iron Works, in the Missouri River Valley and Western States.

TO SUBSCRIBERS AND THE PUBLIC.

Any paid subscriber of "The Age of Steel"—Weekly, Mechanical or Hardware editions—may insert a "For Sale," a "Help Wanted," or a "Situation Wanted" advertisement of not more than 50 words twice in these columns without cost. For any excess over 50 words, cents a word per insertion will be charged.

Parties desiring to purchase machinery, mechanical supplies or hardware goods; or to invest in a business; or in need of catalogues or information, may make their wants known through our reading pages without cost. Or, if preferred, letters of inquiry will be treated as private correspondence and receive attention as such. Address.

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Practical Books for Practical Men

Catalogue of the leading and most important works on STEAM, STEAM ENGINES, MECHANICS, MACHINERY, MECHANICAL and ELECTRICAL ENGINEERING, sent free to any address.

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Box 573, Springfield, O.

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Party with capital to invest in an established Malleable Iron Works, and also take an active office position. Address,
H. L. MATHEWS,
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Three Boiler Rolls.
Three Sheet Iron Rolls.
Two Lever Shears.
Power Punch and Shear.
Squaring Shear.
Combined Punch and Shear.
All in good order.
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Ten Miles, more or less, Spiral Weld Pipe, 8 in. I. D., tested to 250 lbs. pressure, coated with the usual coal tar composition; couplings for lead joints, pipe lengths, 16 ft. to 18 ft.; weight of pipe, 4 lbs. per foot. Tender will be received for this pipe, f. o. b. Chicago, where it may be seen, if desired.
Address all communications to
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Iron Planer, 60 in. x 60 in. x 18 ft., four heads, Betts make.
Iron Planer 34 in. x 26 in. x 7 ft.
Iron planer 7 in. x 36 in. x 24 in.
Iron Planer 24 in. x 24 in. x 4 ft. 1 in. x 25 in. x 6 ft. 6 in.
60 in. x 20 ft. A 1 Engine Lathe.
1 36 in. x 22 ft. Engine Lathe.
1 26 in. x 18 ft. Blacksmith Lathe.
1 Engine Lathe, 53 in. x 18 ft., L. W. Pond make.
1 Heavy Roll Lathe.
1 Engine Lathe 30 in. x 14 ft., Putnam make.
1 Drilling Machine; 45 in. B. G. S. F., 128 inch B. G. S. F., both New Haven.
1 2000 lb. Ferris & Miles Steam Hammer.
1 3000 lb. Bennett, Miles & Co. Steam Hammer.
1 5-ton Foundry Crane.
All kinds of Iron and Wood Working Machinery. Lists sent. NEW YORK MACHINERY DEPOT, Office, 178 Broadway N. Y.

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Before removal from the works PHENIX IRON WORKS, TYNEN, N. J.
72 in. x 30 ft. engine lathe 10 ft. x 16 ft. vert. boring 50 in. x 20 ft. " " 10 in. roller mill, A No. 1 37 in. x 30 1/2 ft. " " 1,000 lb. steam hammer 29 in. x 12 ft. " " 80 lb. Bradley hammer 24 in. x 12 ft. " " 60 in. x 10 ft. planer Milling machine 36 in. x 12 ft. " " Gear cutter 36 in. x 14 ft. " " 12 in. trav. head shaper punch and shear, anvil, etc.
Send for list of all the machines.

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10 Millions Brick
3000 tons Wrought Iron Beams, Girders, Channels, Angles, Tees, Tie Rods, Plates, Bolts, etc.
6000 tons Cast Iron Columns, Pilasters, Pedestals, Capitols, Footings, Bases, Plates, Brackets, etc.
1000 tons Cast Iron Door and Window Frames.
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Besides large quantities of Roofing Slate, Skylights, Radiators, Wall Coping, 15 passenger and freight Elevators, Gas Fixtures, Fine Vanils, Vault Lining, Furring, Rough Skylight Glass, 12 Steam Pumps, 16 Boilers, Engines, Iron Stairs and Balconies, Brass and Iron Valves, Flange Pipe, Tanks, Reservoirs, etc., etc.
Description and sizes given on application.
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One practically new No. 3 Root Iron Clad Blower, to be sold on account of putting in larger size. Address
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1 150 horse power Ball tandem compound engine, high pressure cylinder 12x16, low pressure cylinder 20x16. First class condition and cheap
1 23x11 ft. Reed lathe.
1 14 in. tarrot lathe.
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1 24 in. back geared drill press.
1 21 in. wheel and lever feed drill press.
1 16 in. shaper.
1 12 in. Niles horizontal boring machine
1 pair of 14x18 double cylinder double drum hoisting engines, in first class condition.
WM. C. JOHNSON & SONS MCHY. CO.,
503 North Second Street, St. Louis, Mo.

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ENGINES.

1 200 horse power Corliss engine.
1 150 horse power Corliss engine
1 125 horse power cut-off engine.
1 100 horse power slide valve engine.
1 80 horse power slide valve engine.
1 75 horse power automatic cut-off engine.
1 60 horse power center crank engine.
1 55 horse power self-contained engine.
1 50 horse power self-contained engine.
1 40 horse power self-contained engine.
1 35 horse power slide valve engine.
1 30 horse power slide valve engine.
1 25 horse power slide valve engine.
1 20 horse power slide valve engine.
1 15 horse power slide valve engine.
1 12 horse power upright engine.
1 10 horse power upright engine.
1 8 horse power engine and boiler combined.
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1 8 horse power engine and boiler combined.
2 hoisting engines.
1 steam elevator engines/
4 pair of mining engines.
1 Ingersoll steam drill.
1 portable engine on wheels.

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1 steam pump, 5-inch suction.
1 steam pump, 4-inch suction.
2 steam pumps, 3-inch suction.
2 steam pumps, 2 1/2-inch suction.
3 steam pumps, 2-inch suction.
A lot of similar machines.
1 6-inch plunger steam docter.
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1 duplex pump, 6-inch suction.

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1 2-mold Whittaker dry press brick machine.
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1 4-mold dry press brick machine, Simpson make.
1 4-mold dry press Eureka brick machine.
2 repress brick machines.
1 stiff mud brick machine.
1 brick and tile machine combined.
1 dryer.
Also disintegrators, breakers, screens, trucks, etc.

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We have purchased an entire electric plant, and have for sale Porter-Aiken engine, also Westinghouse engine, dynamos, lamps, etc. We will sell this in whole or parts, as desired.

SCHOELLHORN-ALBRECHT MACHINE CO.,
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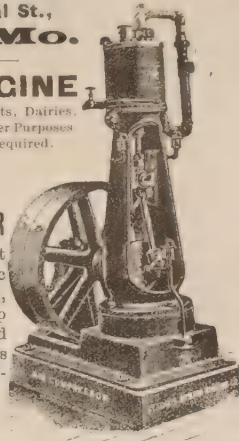
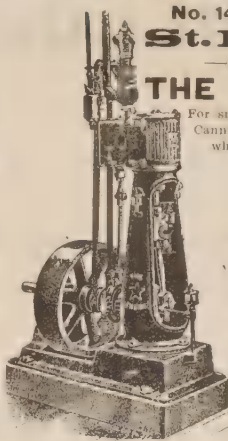
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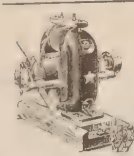
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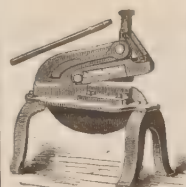
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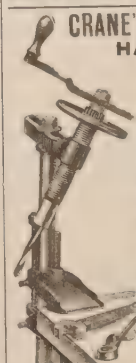
No. 2 weighs 30 lbs. Drills to 4 inch.
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No. 4 weighs 12 lbs. Drills to 2 inch.
No. 4 weighs 12 lbs. Drills to 2 inch.
No. 2 has Pawl Wrench and Ratchet.
No. 2, 3 and 4 are fitted to use 1/2 inch straight shank drills.
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They have all modern features and are worthy of your close inspection.

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our Babbitt Metals to be "self-lubricating," or that they will accomplish other impossibilities.

We Do Claim

that they are made from all new metals, and, consequently, are reliable, uniform, and capable of the best service.

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EQUITABLE BUILDING ST. LOUIS MO.

THE MARKETS.

IRON, STEEL AND METALS.

OFFICE OF THE AGE OF STEEL,
ST. LOUIS, Mo., July 24, 1896.

The week now closing has witnessed a continuation of conditions previously reported. Demand has shown no improvement in any branch of the trade. Bessemer pig iron is reported from Pittsburgh to be quite as dull as ever, only small lots for summer delivery moving, with prices somewhat easier than a week or two ago.

Billets are correspondingly inactive. There is some inquiry, but little buying, as there are so many consuming mills shut down and likely to continue closed in any event until the excessively hot weather has passed. Prices of billets are well maintained by the pool, notwithstanding that for prompt or near-by delivery brokers still seem to have small lots to sell at rates 50c to 75c a ton under the market.

In Southern iron there is as much pressure to sell for early delivery as ever, but it is remarked that the leading furnaces are hardly inclined to accept current prices for shipments covering any very considerable period of time. The same may also be said of Northern furnaces making foundry grades; they are very much dissatisfied with prices in their relation to the cost of materials and labor.

To add to the embarrassments of the situation, production is not declining in any considerable degree. According to the "Iron Age" the indicated production was 180,532 gross tons per week July 1st, against 182,220 tons June 1st. With previous periods, the following comparisons are shown:

May 1, 1896	196	189,398
April 1	200	187,451
March 1	207	199,583
February 1	215	194,999
January 1	241	207,481
December 1, 1895	242	216,797
November 1	239	217,306
October 1	237	201,411
September 1	215	194,029
August 1	200	180,625
July 1	185	171,194

In comparison with previous months the record of the coke and anthracite furnaces stands as follows in gross tons:

	Number in blast	Capacity per week
July 1, 1896	168	174,041
June 1, 1896	175	176,719
May 1	180	184,634
April 1	180	182,162
March 1	187	184,101
February 1	194	192,375
January 1	218	202,237
December 1, 1895	219	211,665
November 1	215	212,127
October 1	204	198,116
September 1	194	189,653
August 1	179	176,380
July 1	168	167,315

During June the following furnaces blew out: One Glendon and one Thomas in the Lehigh Valley, Clinton, one Eliza and one Isabella in the Pittsburgh district, Blair of the Cambria Iron Company, Emma in Ohio, one Illinois Steel Company at South Chicago, Haselton and Hubbard in the Mahoning Valley and one Longdale in Virginia. Duquesne in Pittsburgh, one Troy, Lawrence in the Hanging Rock region, Glasgow in the Hooking Valley, Iroquois at Chicago and Gracey Woodward in Tennessee, were started.

Stocks of pig iron have, by reason of large production and slack demand, increased very noticeably. American Iron and Steel Association statistics of unsold stocks of pig iron on June 30, 1896, show a marked increase over the unsold stocks on December 31, 1895. On June 30 the stocks which were unsold in the hands of manufacturers or their agents, and which were not intended for their own consumption, amounted to 644,887 gross tons, against 444,332 tons on December 31, an increase of

200,555 tons, or over 45 per cent. These figures do not include pig iron sold and not removed from the furnace bank, nor pig iron manufactured by rolling mill proprietors for their own use.

Included in the stocks of unsold pig iron on June 30 were 51,040 tons in the yards of the American Pig Iron Storage Warrant Company which were yet under the control of the makers, the part in these yards not under their control amounting to 60,960 tons, which, added to the 644,887 tons above mentioned, makes a total of 705,847 gross tons of unsold pig iron which were on the market at that date, against a similar total of 506,132 tons on December 31, 1895. The total stocks in the above named warrant yards on June 30, 1896, amounted to 112,000 tons, nearly all of which were held in the South.

In the manufactured iron trade there is an unchanged state of dullness. Mills that closed down round about the 1st have been slow in preparing for restarting, and especially does this apply to bar iron mills. Current demand and prospects have afforded them small encouragement to resume.

In the wire and nail trade there is nothing to relieve the monotony of a protracted period of depression. Nail prices, however, unlike those for barb wire, are still well sustained, nominally speaking.

The metals are quiet and without special feature

ST. LOUIS.

PIG IRON.—The pig iron market presents no new features. Production continues too large for either current or prospective demand, and there is a pretty general desire among the makers that it shall be curtailed, as evidenced by the Philadelphia conference last week of Southern and Eastern furnacemen. It seems difficult, however, to secure concert of action in this direction. A couple of Southern furnaces, which were to close down, it is reported, because of the depressed condition of the market, were continued in blast on the ground that they could be run, it is further reported, as long as competitive plants.

Sales during the week now ending have been light, consisting mainly of small lots for prompt or near-by delivery. Prices are characterized by extreme weakness, although for extended shipments Southern furnaces are not so much inclined to accept the minimum rates current.

Quotations f. o. b. cars, St. Louis:

Southern coke irons.	Miscellaneous.
Foundry, No. 1, ... \$10.75	Ala. c. c. f'dry ... \$16 00
Foundry, No. 2 ... 10.25	Ala. c. c. car wheel 16 50@17 00
Foundry, No. 3 ... 9.75	Missouri charcoal 12 50@13 00
Soft, No. 1 ... 10.25	Lake Supr. ... 15 00
Soft, No. 2 ... 10.00	Missouri Bessemer 12 50@13 00
Grey forge ... 9.75	Ohio softeners, ... 15 50@16 00
Mottled ... 9.75	

IRON AND STEEL BARS.—Though there is nothing in the labor situation of serious import, the mills are not pushing preparations for restarting. The uncertain prospects for trade and the hot weather are deterrents so far as the bar iron mills are concerned, and the same influences, coupled with the high price of steel to plants not making their own billets, conduce to the continued idleness of steel mills now closed.

In the local market there is a quiet and unchangeable state of affairs. There is, perhaps, a moderate amount of small orders being placed at the stores, but outside of these there is a paucity of business all around. Quotations are nominal:

Bar steel, in car lots	\$1.50
Bar steel, less than car lots	1.65
Bar iron, in car lots, East St. Louis	1.30
Bar iron, less than car lots	1.40@1.50

The Ewald Iron Company, St. Louis, quote as follows out of store:

Bar iron	\$1.40 rate	E. I. C. c. iron	3.25 rate
Boone iron bars	2.10 rate	Tenn. c. c. bloom	5.00 rate

MERCHANT STEEL.—While occasional orders are being received by the mills for season shipments, all reports go to show that trade is dull. Among the local jobbers there is something doing all the time, in small orders, as must needs be, but there is no life to trade or any prospects of immediate revival.

MERCHANT AND AGRICULTURAL STEEL.

Open heart tire	per lb. 2.10c	Open heart toe calk	2.20c
" spring	" 2.40c	" plow-slabs	2.30c
" machinery	" 2.10c		

Solid cast plow-slabs	per 100 lbs.	2.7
Crucible cast plow-slabs	" "	3.25
Soft center plow-slabs	" "	6.00

TOOL STEELS.

Crucible cast	per lb. 6@8 1/2c	Superior cast	per lb. 10@10 1/2c
Extra cast	" 12@12 1/2c	Double extra	" 17c
Special	" 14c	Self hardening	" 37 1/2@40c

JESSOP'S STEEL.

English tool	per lb. 15c	English tool, die	per lb. 18c
Double shear steel	" 15c		

The Ewald Iron Company, St. Louis, quote:

Crucible tool steel.....	7c
The Carpenter Steel Co., New York and St Louis, quote high grade crucible steels as follows:	
Standard.....	13c
Extra.....	15c
Special.....	20c
Double special.....	30c
Air hardening.....	4c

PLATES AND SHEETS.—There is keen competition among the plate mills for the few orders offering, with the result that prices are trimmed very close. Trade in sheets is also very limited. Galvanized continues low and unsettled. Discounts of 80 to 80 and 2 1/2 are about the market, and in rare cases 80 and 5 is probably made.

4 inch and heavier tank steel	1.0c		
3-16 inch and No. 8 tank steel, 60 inches wide and under	1.80c		
3-16 inch and No. 8 tank steel, over 60 inches wide	1.90c		
Flange steel	2.20c	No. 14 soft steel	2.10c
Flange steel heads	2.45c	No. 16	2.25c
No. 10 soft steel	1.90c	No. 18	2.40c
No. 12 soft steel	2.00c		

STRUCTURAL MATERIAL.—Demand has further subsided, and there is also lessened inquiry. Pittsburgh mills, however, keep pretty well employed on large orders from New York and other cities, including San Francisco, and in bridge material orders from Mexico. Locally, mill agents report a quiet state of affairs with prospects not very encouraging. About 600 offices will come on the market early in January through the completion of new buildings. This presages less activity in the construction of large office buildings. One office structure that was to be eighteen stories high as originally planned has been cut down to six. Prices delivered, St. Louis: Angles, \$1.62 1/2; beams, channels and tees, \$1.77 1/2; steel bars, \$1.45, half extras.

PIPES AND TUBES.—There is some inquiry reported by Pittsburgh mills for 6 and 8 inch pipe, an aggregate for two or three requirements of probably 300 miles, and some orders for other sizes have recently been placed. But on the whole trade is far from encouraging, and on merchant pipe quotations of five 10's to five 10's and 5 continue for large orders. In the St. Louis market demand is reported light and scattering and prices a matter of private arrangement.

RAILS AND FASTENINGS.—Trade is distressingly dull. The shipments of standard rails from the mills for the first half of the year did not quite equal 500,000 tons, while the unfilled orders on July 1st, were about 175,000 tons. Quotations: Standard rails \$30.60, East St. Louis; splice bars, \$1.60; spikes, \$1.75; bolts square nuts, \$2.30; with hexagon nuts \$2.40; steel links and pins, \$1.65.

OLD RAILS AND CAR WHEELS.—Occasional purchases of round lots of old iron rails by Western dealers are reported, but the mills are not market factors at this time. A nominal quotation is \$13.50@14. Old steel rails for melting stock are quotable at \$9.50@10. Old car wheels are worth about \$13.50@14.

SCRAP IRON, STEEL AND METALS.—There has been little or no improvement in scrap the past week. Old metals were in fair demand, and old steel rails for relaying purposes were pretty freely called for, but the aggregate of business was, on the whole, unsatisfactory.

F. o. b. cars, St. Louis, per ton of 2000 lbs.

No. 1 R. R. wrought iron	13.00	Cast iron borings	5.00
Old car wheels, net	13.00	Steel springs, mixed	11.50
Heavy sheet iron	6.75	Cast iron, heavy	9.00
Malleable	7.00	Stove plate	5.50
Axle turnings	7.50	Mixed steel	9.00
Machine turnings	6.50		

Old metals:

Light copper, per lb., cts.	9 1/2	Heavy brass, per lb., cts.	9
Heavy copper, " "	10	Lead	3 1/2
Light brass, " "	6	Zinc	2 1/2

PITTSBURG.

Pittsburg, July 21, 1896.

The iron and steel trade has marked another week of dullness, slack trade and generally unfavorable conditions. As the season advances conditions seem to get worse, and trade is slower. There seems to be a growing impression that there will be no material improvement before the close of the presidential campaign. The financial question

which is the main issue, has been so clearly defined, and the two sides so sharply marked out that public attention will in a great measure be taken up with politics during the next three months. Each week shows that the wage question cannot be a point of difference this year, as employers and employees are settling matters, and without any trouble arranging rates for the coming year. In nearly all lines there is some business going, although in some it is hardly enough to mark prices, and while the outlook for immediate business is decidedly blue, there seems to be a general feeling that things will recover, and the coming political contest will settle the monetary question in a way that will bring prosperity and a revival of trade within a short time.

PIG IRON.—There has been nothing like an improvement in the pig iron trade since our last report. In fact, the trade seems to be growing duller, as the consumption of raw material is not large just now. All efforts of the furnace owners to get together and map out a line for a betterment of trade seem to be futile. Production is being cut down, but it is not through any concerted movement. This week prices show a lower range. Grey forge iron is now quoted at \$10.25@10.50; No. 1 foundry, \$12.00@12.25; No. 2, \$11.50@11.75. Bessemer is also a shade lower and is now quoted at \$12@12.25.

MUCK BAR.—With nothing new on which to base a price, the old figures \$19.50@20 are still quoted.

SHEET BARS.—There is no new demand for sheet bars, and the market is without quotable figures.

GALVANIZED SHEETS.—The call for galvanized sheets is fairly good, but it is not up to the mark for this season. Prices remain as they were, with discount rates quoted at 75 & 10 off in car load lots, and 75 off in smaller quantities.

FINISHED MATERIAL.—There are some inquiries for finished material being received by the mills, but trade is quite slow. There has been no change in prices. Iron bars, 1.20c; steel bars, 1.15@1.20c; steel tank plates, 1.35@1.40; No. 24 sheets 2.20@2.25c; No. 27, 2.30c; skelp iron 1.30@1.35c for grooved, and 1.40@1.45c for sheared. Skelp steel, 1.15@1.20c for grooved, 1.30@1.40c for sheared.

CORRUGATED ROOFING.—This line ought to be well employed at this season, but it is not, as business is decidedly slow. There has been no change in prices. No. 24 gauge, \$3; No. 26 gauge, \$2.40; No. 27 gauge, \$2.35; No. 28 gauge, \$2.10.

BLOOMS AND BILLETS.—The makers are doing little in the way of selling Bessemer blooms and billets, but a few small lots are still being sold by the brokers. The pool rate stands at \$20.25.

STRUCTURAL MATERIAL.—The mills are fairly well employed just now, but there is no brilliant prospect ahead. Prices are as follows: Angles, 1.20@1.30c; tees, 1.35@1.40c; beams and channels, 1.55c; refined bars, 1.30@1.35c.

STEEL RAILS.—There has been no change, and the \$28 rate still prevails.

WROUGHT IRON PIPE.—Although this should be a good season for the pipe trade, it is very dull just now. There has been no change in discount rates.

	Per cent.
Butt Welded, Black	Base.
" " Galvanized.	57
" " Black	52
Lap " Black	67
" " Galvanized.	55

SCRAP IRON AND STEEL.—There is very little trade going in the scrap market, and quotations are merely nominal. No. 1 railroad wrought \$12 net; hammered iron car axles, \$16@17 net; wheels \$12 per gross ton; cast scrap \$11 per ton; cast iron borings per ton, \$7.50.

BIRMINGHAM.

Birmingham, Ala., July 21, 1896.

The pig iron market in this district does not seem to improve much. There is some movement, but not much. Orders are slow in coming in and quotations are being asked for. None of the iron concerns in this district are taking orders for delivery beyond November at the prices now in vogue, for the general opinion among the iron men is to the effect that after elections in the month of November prices will advance. There were a few shipments made during the last ten days by way of Mobile and the Gulf for Eastern points. None of the

furnaces have gone out of blast lately, though it was reported that the Pioneer Mining and Manufacturing Company, running two large furnaces at Thomas, Ala., near here, intended shutting down. It is said the company has given out the statement that as long as other companies can continue to run their furnaces while the prices are at a low stage, they can do the same.

The large blowing engine at the Sloss Iron and Steel Company's city furnaces has not yet been put to work. There was some trouble experienced in making a connection with some of the blowing pipes and a delay of some time was the result.

PIPE WORKS.—The Howard-Harrison Iron Company, at Bessemer, twelve miles from here, shipped on last week twenty car loads of iron pipe to Boston. The pipe was consigned to the Water Board, of Boston, and was sent on fast freight. It is stated that the company has lately received some very good orders. The works are running with almost a full complement of hands.

The Alabama Pipe Works, at Bessemer, manufacturers of sanitary castings and pipe, resumed operations this week after a short shut down for the purpose of making certain repairs. The full force, 120 men, will soon be at work in the plant and the usual output, from 25 to 30 tons per day, will be attained.

THE COAL BUSINESS.—The coal business shows signs of improvement. By the end of this month there will be an increase in the output it is thought. As soon as cotton ginning begins, it is believed that the coal business will take on a decided change for the better.

ROLLING MILL STRIKE.—The puddlers, heaters and rollers in the rolling mill department of the United States Car Company's plant at Anniston are out on a strike. The trouble has been brewing for two weeks, beginning about the first of the month, when the price scale contract between the company and the puddlers, heaters and rollers, who are members of the Amalgamated Association of Iron and Steel Workers, expired. The company agreed to the raise ordered by the Amalgamated, but refused to sign the contract. Vice President Thomas Mason, of Gate City, Ala., of the Amalgamated Association was called to Anniston, and he advised the strike. Another grievance claimed by the men is that 2 per cent of their wages is held back in the office as an insurance fund. The strike seems to be earnest. There is no rolling mill in Alabama in blast now, the two in the Birmingham district being closed down for the summer and for repairs. It is believed that as soon as the heated term is over and the repairs made about the mills here and at Gate City, the new scale will be signed and a contract drawn up between the men and the two companies.

THE IRONATON FURNACES.—The United States Car Company at Anniston has just finished a three months' job of iron work on the repairs which are being made on the two furnaces at Ironaton. This work has formerly been done at Pittsburg, but this time a Southern concern got the job, and it is said it did satisfactorily.

TWO IRON BRIDGES.—Contracts have been awarded by the County Commissioners of Lauderdale County, for the erection of two iron bridges. One will cost \$3240 and the King Bridge Company, of Atlanta, Ga., will build it. The other is to cost \$1193, and the Converse Bridge Company, of Chattanooga, Tenn., secured the contract.

CHICAGO.

Chicago, July 21, 1896.

Business during the past week has been in the saddle on a lame horse. No activity has shown itself in any line. Some of this is no doubt due to what is known as midsummer dullness, and probably quite a little to the political uncertainties more or less clouding the horizon. No one is expecting a clear and definite outlook, to come out like a sunburst suddenly and brightly. The general opinion is that trade will lag till after the elections. It is simply a case of suspense. Demand is holding back, and orders are keeping on the roost, till the clock strikes the hour, and then the usual reaction may be reasonably expected. Demand at present is below normal limits and sooner or later it must resume its old pace and resuscitate its present dormant activities.

PIG IRON.—No large business is reported. Buyers

CARTWRIGHT & MASSOT, PIG IRON AND COKE.

—SALES AGENTS FOR—

Colbert Iron Co.'s Lady Ensley Pig Iron.

Mt. Carbon Co.'s Powellton Coke.

421 Olive Street, ST. LOUIS, MO.

are but in poor evidence and when in sight are on a keen scent for bottom quotations. Some breaks have been made in prices in order to secure what crumbs of trade are to be picked up. Sellers, however, as a rule are not eager to secure contracts for long deliveries at current prices. Everybody is waiting for the hatching of the political egg, and presumably this conservatism is not unwise even if unpleasant. Present quotations are as follows: Lake Superior Charcoal, \$13.50@14.00; Coke No. 1, \$11.75@12.00; No. 2, \$11.25@11.75; No. 3, \$11.00@11.25; Southern Coke No. 2, \$10.85@11.10; No. 3, \$10.35@10.60; Ohio Strong Softeners, 14.00@14.25; Alabama Wheel, \$16.75@17.25.

STEEL RAILS AND FASTENINGS.—A fair amount of business has been done during the past week. It has, however, been mostly in small orders. Prices remain unchanged and the market if not on the spurge is firm. Quotations: Standard steel rails \$28 and upward. Spikes, \$1.70@1.75; track bolts, hexagon, \$2.10@2.20; square nuts, \$2.00@2.10; splice bars, \$1.35@1.40.

STRUCTURAL IRON AND STEEL.—But little is doing in this line and what there is, is in small orders. Inquiries are all tuned to the minor key. Quotations are as follows: Tees, \$1.60@1.65; angles, \$1.35@1.40; universal plates, \$1.40@1.50; beams and channels, \$1.70@1.80, mill shipments.

MERCHANT IRON AND STEEL.—Trade is dull and shows no improvement over the condition as last reported. Quotations are: Tool steel, \$5.50@7.00; smooth finished machinery, \$1.60@1.65; smooth finished tire, \$1.55@1.70; open hearth machinery \$1.85@1.95.

OLD RAILS AND CAR WHEELS.—Sales are slow, though a heavy deal has been reported in old iron rails. The situation is one of stagnation and lassitude. Quotations: Old wheels, \$12.00@12.50; old iron rails nominal at \$13.00@13.50; old steel rails, \$9.50@10.

NEW YORK.

New York, July 21, 1896.

The business actually done is small. It is simply a re-telling of what is now a monotonous story. Conservatism is the rule, and all breaks away are the exceptions. Cases are not wanting of buyers taking advantage of cheap prices in anticipation of a future possible rise. It is also certain that concessions are being made where conditions are favorable, but the situation broadly stated is strongly conservative. Financial and political possibilities are of course more or less influencing trade, but, as a general thing, confidence in the future is unimpaired.

PIG IRON.—Business is hardly up to the notch even for dull times. It is made up mostly of small orders and these kept close to immediate requirements. In Southern irons some cutting has been done, and the market is not without some shaking of the knees. Quotations are as follows: Northern brands No. 1 foundry, \$12.00@13.00; No. 2, \$11.75@12.25; grey forge, \$10.75@11.00; Southern brands No. 1 foundry, \$11.25@12.50; No. 2, \$10.00@11.00; No. 1 soft, \$10.05@11.00; No. 2, \$10.25@10.50 tidewater delivery.

RAILS AND FASTENINGS.—Inquiries are limited to unimportant lots, and what orders are being filled are of a hand to mouth type. Present quotations: Standard rails \$28 and upwards; spikes, \$1.60@1.65; angle bars \$1.25@1.30 at mill; bolts and square nuts, \$1.90@2.05; hexagon, \$2.05@2.10.

STRUCTURAL MATERIAL.—Not much business is at present being done, though it is claimed that an early improvement is within sight-line. Quotations for large lots are: Angles, \$1.40@1.50; beams up to 15 in., \$1.70@1.75; tees, \$1.65@1.70; channels, \$1.70@1.75.

MERCHANT STEEL.—Trade is sluggish, and in no special line seems to be even normally active. Quotations are: Soft steel bars, \$1.20@1.25; steel axles, \$1.70@1.75; refined bars, \$1.35@1.50; steel hoop, \$1.50@1.55.

OLD MATERIAL.—Trade is in the dumps and

seems likely to keep there. Stocks, however, are not large, and holders are not sprinting for business. Quotations are: Old car wheels delivered \$13.00@13.50; old iron rails, \$13.50; old steel rails, \$11.50@12.00.

PIG IRON.

Agency Reports.

At Cincinnati.

On July 22d, Messrs. Rogers, Brown & Co., Cincinnati, O., reported as follows:

There can be no doubt that the week under review has been the quietest of the summer, and yet quite a fair business has been done. Prices on Lake Superior charcoal iron are well maintained, but in every other class of pig iron all important sales have been worked out in each case independently and separately, as market prices are nominal.

While the market is weak, buyers find the furnaces unable to meet their extreme views and demands as to prices, revealing to them more strength in the market than they looked for. During the past ten days three important stocks in the South have been blown out and one has been banked; others must follow unless the market revives. In the Mahoning and Shenango Valleys and in Pennsylvania several furnace companies will retire during the next fortnight. With the rolling mills nearly all closed down, and a limited consumption of pig iron at the foundries, the stocks at the furnaces increased the past two weeks.

Buyers are taking their iron on old orders a little more freely, relieving the furnaces somewhat of their surplus stock. The extraordinary depression of values in the stock and bond market, the continuance of cheap prices on all products, and the slender margin of profit anywhere in anything, makes the present condition a discouraging one; but many feel that everything now has been discounted and that general business is in the condition of a typhoid patient who has passed the critical period, and, though recovery must be slow, the optimists are very hopeful of a steady and continued improvement from the low level of to-day.

We quote for cash f. o. b. cars, Cincinnati.

Southern coke, No. 1 foundry	\$10 25 @ 10 50
Southern coke, No. 2 foundry	9 75 @ 10 00
No. 1 soft	9 75 @ 10 00
Lake Superior coke, No. 1	12 00 @ 12 50
" " " " " "	11 50 @ 12 00
Hanging Rock charcoal, No. 1	15 50 @ 16 50
Tennessee charcoal, No. 1	13 50 @ 14 00
Jackson County Silvery, No. 1	13 00 @ 14 00
Southern coke, gray forge	9 00 @ 9 25
Southern coke, mottled	9 00 @ 9 25
Standard Alabama car wheel	14 75 @ 15 50
Tennessee car wheel	13 50 @ 14 50
Lake Superior car wheel and malleable	14 75 @ 15 25

PHILADELPHIA IRON MARKET.

(Daily Metal Market Report.)

In the ordinary sense of the word there is no market for iron or steel. Some business is being done, of course, but the price is a matter contingent upon circumstances. Round lots can be sold, but in such cases a special price has to be made, and if the settlement is in cash or its equivalent, 25, 50 or even 75 cents per ton has to be knocked off. Small lots that people must have command something near to quoted rates, but even in these a few bars, or a few plates, or a few shapes, can be had pretty nearly at car load rates, providing the customer is worth cultivating for future business. Taking everything into account, the situation is very much strained, and improvement not in sight at this writing.

PIG IRON.—Bargain lots are around at the low prices quoted last week, but the buyer must be glib edged to secure the full advantage. The sellers, when confronted with the low figures, explain them by saying that quality was a little off, and orders came from headquarters to close out at best figures obtainable, and they want more money for their regular irons, &c., &c. All the same the buyer understands the matter differently.

STEEL BILLETS.—Prices are still held at \$21.50, but there is no demand, and the air is full of rumors of a readjustment of quotations.

FINISHED MATERIAL.—Orders are few and unimportant, and although in many cases business is badly needed. There seems to be a disposition to keep the mills idle, rather than accept the low figures necessary to secure a fair sized order.

OLD MATERIAL.—Prices are virtually unchanged, but there is easily 25 to 75 cents per ton difference on the same article, spot cash, or the usual time. Holders don't care much about parting with material, which is regarded as good value at present prices, unless they get something just as good for it, and as we said before, "spot cash" is a big inducement, while paper which is not easily saleable is given a wide berth. This is no reflection upon anyone's credit, but is one of the developments of the peculiar conditions which now prevail.

THE HARDWARE TRADE.

CONDITIONS AT THE PRINCIPAL CENTERS.

At St. Louis.

There is nothing new to report in the general situation. Trade is dull and the movement of goods is slow. Everybody seems to be chin-deep in the political maelstrom, and till the swirl is over business is not likely to get into good trim. The outlook is certainly hazy, and is likely to be more or less obscured till November lifts the curtain. Recent rains and favorable crop reports give the situation a more hopeful character, and if a fat corn crib is the symbol of business prosperity the farmers wagon will carry trade into better times. "Waiting for the wagon" is just now pretty general.

NAILS.—Both manufacturers and jobbers refer to trade as extremely quiet. There is, in fact, so little demand that it is difficult to realize there is any at all.

Association quotations:

Steel cut nails, straight car lots, \$2.50 rates.
Steel wire nails, straight car lots, 2.75 rates.

BARB WIRE.—Extremely limited demand and weak prices are the prevailing and only features of the market.

John Coles & Co. quote barb wire, as follows: F. o. b. St. Louis in straight or mixed car lots, usual terms.

	Painted.	Galv'd.
Glidden barb wire, painted	\$1 05	\$1 95 Cwt.
Wire fence staples, Annil	1 65	1 95 "
No. 6 to 9 smooth wire, Annil	1 35	1 65 "
Smooth wire Nos. 10 & 11, 10c; 12 & 12½, 20c; 13, 30c; 14, 40c—advance over No. 9.		

FIRE ARMS AND AMMUNITION.—Dullness still characterizes these lines, and prices remain unchanged:

	SHOT.
Patent, per bag	\$1 20
New York chilled	1 50
2-0, 3-0, 3-B, 2-B, 1-B, chilled, per bag	1 45
In 30-bag lots no charge for drayage; 2 per cent off for cash in 10 days.	

WHITE LEAD.—A slight falling off in the demand for white lead has been observable during the past week. Up to this time there has been a very large trade, and dealers are looking forward to an early return of activity.

We append the quotations made by the local branch of the National Lead Company, which are subject to change without notice:

Strictly pure white lead, dry white lead, red lead or litharge, in kegs, in lots of less than 500 lbs.	54c
In lots of 500 lbs. and over	54c
Red lead and litharge, in bbls. and half bbls.	4c per lb. less than price in kegs
Dry white lead, in bbls.	54c
Strictly pure lead, in 25-lb. tin pails, 4c; in 12½-lb. tin pails, 1c, and in 1 to 5 lb. tin cans (100 lbs. in case), 1½c per lb. over keg price.	

Terms—On lots of 500 lbs. or over, 60 days, or 2 per cent discount for cash if paid within 15 days from date of invoice.

At New York.

New York, July 21, 1896.

Business during the past week has been markedly dull. Buyers are exceedingly cautious, and manufacturers are evidently hesitating to skate on thin ice. No one expects any radical change in the situation till political and financial issues are settled by the ballot box in November. Prices are inclined to straggle and are not being kept in line so easily. Collections are of a gingerly nature, and credits are pretty closely investigated. The outlook is not without its complications, and till the crisis line is crossed will continue to be one of suspense and anxiety. Wire nails continue to be quoted at \$2.70 for car load lots on dock, and \$2.80 for small lots from store. Cut nails are quoted at \$2.45 for car load lots on dock, and \$2.57 for small lots from store.

At Chicago.

Chicago, July 21, 1896.

There has been but little stir in business during the past week. The movement of goods is slow, and orders for such as are going are mostly for what is wanted and nothing more. No one seems in a

hurry to load up beyond immediate requirements. Political uncertainties aggravate rather than improve the situation, and it is not likely that anything definite will shape itself till the presidential campaign is finally concluded. On the other hand a fair amount of contracts are being made for future business. The crop situation is encouraging, and a strong optimistic sentiment is under the surface of apparent caution and conservatism. In wire nails trade during the past week has been dull. No spurt in any direction is noted. Prices keep at the old figure, \$2.70 base, Chicago for factory lots, and \$2.80 for small lots. In cut nails the same conditions prevail, and little seems to be doing beyond keeping up stock. Prices are without change, \$2.45 base, car load lots, and \$2.55 for small lots from stock. Barb wire has settled down to the usual dull routine business of the season. Prices \$1.70 for painted and \$2 for galvanized in car load lots with the usual 5 to 10 cents advance on small lots.

METALS.

PIG LEAD.—Few sales are reported as having been made the past week. Buyers have been forcing the prices down wherever possible, despite the efforts of the more aggressive dealers to prevent it, and the quotation at this writing is \$2.67½, or 2½c lower than last week at this time.

SPELTER.—This metal has shown little life the past week. Sales were few and far between and actual transactions were made on a basis of \$3.82½.

LEAD MANUFACTURES.—There has been only a fair demand for these goods since our last review. The aggregate of business done was not as large as usual at this season, but dealers are anticipating an early improvement.

Lead pipe, 3.40c (Glazier lead, 5c)
Sheet lead, 3.90c Bar lead, 3½c
Terms—Thirty days, 1 per cent off for cash. If paid within ten days of invoice date—f. o. b. cars at St. Louis, Mo.

COPPER.—The New York market closed flat Wednesday at 10.75@11.15c for spot Lake ingot; casting copper, in car lots, M. A., 10.87½c; Orford, 10.87½c; other grades, 10.62½c@10.75; electrolytic, 11.00@11.25c. Locally, the market is 11c for small lots of casting from stock.

TIN.—The New York market was easier Wednesday. Settling prices were as follows: Spot, 13.50 to 13.60c; July, 13.45@13.50c; August and September, 13.35@13.45.

The local market is 14½c for retail lots from stock.

COAL AND COKE.

COAL.—The past week has been a rather quiet one in the coal trade. Dealers report about the same conditions as have prevailed the past month or two, but are expecting an improvement after the first of next month.

EAST ST. LOUIS, CAR LOTS.	
Ava	per ton \$ 85
Percy	per ton 1 75
Illinois (Standard)	80

Delivered prices to steam users in this city, from \$1.75 to \$1.90 per ton. Delivered prices to residences, \$2.75 per ton.

ANTHRACITE—EAST ST. LOUIS, DELIVERED.	
Chestnut	per ton \$ 7 25
Stove	7 25
Grate	7 00

COKE.—The demand the past week was a little larger than for several weeks previous, but dealers could stand a considerable increase without suffering any inconvenience.

IN CAR LOTS, ST. LOUIS.	
Connellsville foundry coke, 72-lb. fry.	\$4 35
New River	5 25
Pocahontas	5 25
Crushed	4 85
Gas works coke, lump, per bushel	10c

Pittsburg Correspondence, July 21.

There is a better outlook for the coke trade owing to reduced freight rates that will give the Connellsburg region a better chance. Prices are being held, with furnace coke at \$2; foundry \$2.30; crushed \$2.35.

Parkhurst & Wilkinson, one of the oldest iron and steel firms in Chicago, made an assignment on the 24th inst. The assets are \$300,000, liabilities unknown, but thought to be at least equal the assets. Slow collection is given as the cause of the failure. The firm made an assignment in 1893 also. The liabilities were then nearly \$500,000.

St. Louis Spanish Club Bulletin, July 11, 1896.

The attention of our members is called to the fact that a recent order has been promulgated for the expedition of the mails across the Mexico border, which provides for the exchange of mails between the United States and Mexico by means of the Railway Postal Service. This does away with the stopping of the mails at the post offices of both countries along the line, and effects a saving in transit of 24 hours, and more in some instances. The mail allowed to thus pass without interference is restricted to unregistered letters, postal cards and periodical publications, and all postage is required to be prepaid in full. This expedition of our through mails to Mexico is of great importance to our commercial export interests.

CENSUS OF MEXICO.

The Federal Census of Mexico, which has just been completed, shows a population of 12,542,057. The population of the principal cities is rated as follows:

City of Mexico	339,935
Pueblo	91,919
Gaudalajara	83,870
San Luis Potosi	69,606
Monterey	56,835
Merida	56,702
Pachuca	52,189
Durango	42,186
Zacatecas	40,026

A report recently adopted by the New York Chamber of Commerce says:

"The events of the past year furnish some object lessons to American producers, manufacturers and merchants, which are worthy of more than passing consideration. The war in the East has probably inaugurated a new epoch for hundreds of millions of people. The partition and opening up of Africa is scarcely less important in its ultimate results to commerce. Thus far our increase in population and wealth in this country has measurably kept consumption on a parity with production, but evidences are not lacking that this state of things cannot continue. If we would keep step to the music of the times and keep our labor and capital remuneratively employed, we must bear in mind the wants of the other thirteen hundred and seventy millions of people, who constitute the population of the world—both natural and creative, or educational wants."

Resolved That, in the opinion of this Chamber, the present year marks an epoch in commercial history, that the present is a time worthy of the best efforts of our producers, manufacturers and merchants, to extend the export trade of the United States, and that these efforts should be supported by a wise and progressive policy on the part of our Government.

STATE OF SONORA.

The State of Sonora produces great quantities of silver and is rapidly taking rank as the greatest producer of gold in Mexico. Large numbers of veins are being developed with success in the Torres district. It is only a question of a few years until the reputation of that region for gold production will equal that of California in her palmist days. The State is also very rich in agricultural resources. It is a territory which should be a commercial tributary of St. Louis. Freight rates from St. Louis to the State of Sonora are based on Pacific Coast terminal rates (the same as to San Francisco, Seattle and Portland) and the freight from Chicago, Cincinnati and other competing markets has to be shipped on local rates to St. Louis added to the Pacific Coast terminal rates. The merchants of the State of Sonora are exceedingly enterprising, active and alert, and St. Louis houses having salesmen in Arizona should instruct them to canvas the Sonora Territory via the Sonora Railway route, from Nogales, Arizona.

In its issue of April 3d, 1895, "The British and South African Export Gazette," publishes an article on American trade with South Africa, from which we quote the following:

"The rapid growth of American trade in the market is with which this journal deals is certainly very instructive. The produce and manufactures of the United States shipped to South Africa throughout the year 1895 amounted to \$6,400,000 as compared with \$4,200,000 during 1894. This gives an increase of 51 per cent. Comparison of the figures on thirty principal articles of British merchandise and manufacture shows that the increase on American exports to South Africa has been more than double the increase in British exports; while the increase in the United States shipments was at the rate of 51 per cent, that of Great Britain was only at the rate of 24 per cent. We

particularly desire to call the attention of British engineers to the enormous increase in American machinery sent to South Africa. The figures for agricultural implements form a striking contrast to the result of the British trade during the same period; while general steam engines and machinery increased from \$140,000 in 1894 to \$1,200,000 in 1895. Other lines of American goods, which have shown large increases, are breadstuffs, wheat flour, American lumber and manufactures thereof, unmanufactured wood for mining and building purposes, builders' hardware, mechanics' tools, carriages, cars, leather manufactures, wearing apparel, canned beef, vegetable oils and mineral oils."

We have been shown a letter received by one of our members from one of their customers in the Republic of Uruguay. The customer writes: "I beg to inform you that I have finished unpacking the goods you sent me per Steamer 'Galileo,' and find everything in good order. I am very thoroughly satisfied with the goods sent me. They arrived in first-class condition, are of good quality, and at relatively low prices. I will remit you for the shipment in a few days."

If our members will turn to the map and see where Uruguay lies, it will be apparent how far-reaching is some of the business already being done in Spanish American countries by some of the members of our organization.

The Punch and Judy Press.

The Manufacturer, Philadelphia: In reference to the feeling of bitterness lately manifested in certain Western communities for the East and Eastern influences, the "Republican," of Springfield, Mass., (a strong gold paper) places much of the blame for the existence of such sentiments upon the newspapers of New York City.

"How exasperating," (says the "Republican,") in its tone of studied contempt, or unstudied ignorance, has been much of the criticism by New York newspapers of recent political and economical developments in the West, developments of most profound importance!"

This is a just comment, but it may be made, not alone upon the methods of the New York journals, but upon those of the papers of Philadelphia and other cities. The currency question, in one phase of which great multitudes of Western men have been profoundly interested, has not had any measure of intelligent, dispassionate discussion in the Eastern press. Important truths have been studiously concealed, palpable misrepresentations have been urged as if they were demonstrated fact, and every man in public or private life who has not been willing to accept the naked gold standard as a finality has been treated as if he were devoid of all moral principle. The Western men who have held either moderate or extreme views upon this subject have not been reasoned with; they have simply been vituperated. It is a fair supposition that they cannot all be rogues or fools, even if their theories be unsound and dangerous. The question is discussed temperately in Europe, as other public questions are discussed in this country, and it is in every way a grave misfortune that this one should not have been dealt with in such a manner. The certain consequence of the policy adopted by the press has been to inflame the passion of the Western people, to intensify sectional feeling, and perhaps to impel many moderate men in the West to cast in their fortunes with those who are quite immoderate in their demands.

The interest of the North Atlantic States and the Western States are identical. They are identical even if the East be regarded as the creditor of the West, for the welfare of the creditor is found in the prosperity of the debtor. The people of the West are the greatest consumers of the manufactures of the East, the greatest buyers from Eastern merchants. Their products pay our foreign debts. If they suffer we suffer as individual Americans, producers, and traders, and as members of a nation of exporters of raw materials. The Western producers have indeed suffered much from shrinkage of the value of their products; of that there can be no doubt. They believe reasonably, or unreasonably, that the source of their troubles is to be found in currency conditions. This is a question which might, one would imagine, be considered without heat. It is simply a question of fact. Manifestly the right way to deal with it would be to study it in the light of all available information, admitting that men on both sides have a right to be regarded as honest men. Nothing can possibly be gained in the end either by suppressing evidence or by villifying the men who may possibly entertain erroneous

opinions. The Eastern newspapers, however, have resorted to both of these practices; and they have pursued them with such vehemence and even ferocity that eminent public men in the East who have declared over and over again in the past for bimetalism by safe means have been brow-beaten and intimidated so that they are actually afraid to say what they think. Surely this is the wrong way to deal with a matter upon which millions of Western freemen hold strong convictions, which they will be likely to express at the polls.

Hardware Trade of Cincinnati.

The hardware trade of Cincinnati is one of the many important lines of business that have given the city its proud place in commercial eminence. As a gateway to the South, its facilities for the distribution of products both by water and rail are in favor of an extended and prosperous trade. The unfavorable conditions of business extending now over several years has not left Cincinnati without a touch of the frost, or a taste of the bitterns. It has, however, made a good showing. The hardware trade has been fair in spite of unpropitious times. In the year 1890 the manufactures of hardware were valued at \$1,142,000. The retail trade in very prosperous times is estimated as approximating one and a half or two million dollars. Since 1892 the figures are hardly so fat. There was a falling off in the building trade, and in all lines of manufacture where shelf and heavy hardware was used. This condition has been more or less general. In 1892 the value of shipments were \$49,960 more than in 1891. In 1893 they were \$1,117,320 less than in 1892. In 1894 and 1895 they were \$1,283,340 less than in 1891 and 1892; a falling off of twenty-five per cent. These figures leave the decrease in retail trade untouched. In an article on this subject by James P. Gardner in the Merchant and Manufacturer, of Cincinnati, from which we have quoted these figures, the writer gives the trade experience of some of the leading hardware dealers. The business of this year compared with that of the first six months of 1895 simply held its own. All things considered it might be reasonably stated as being fair, though behind what it would have been had conditions been more favorable. It was the conviction of business men generally that in order to have a better state of affairs and a return to prosperity, that the money of the country be put on the most firm and substantial foundation possible. This in connection with the adequate protection of American industries and a return to reciprocal relations with other nations would once again assure business prosperity to the hardware men of Cincinnati and elsewhere.

Special Retail Hardware Notes.

Lewis & Hardy, Paso Robles, Cal., have assigned. Goodrich & Ensley, Chariton, Ia., have dissolved. J. F. Hirrlinger & Son, Clarence, Mo., have sold out to J. R. Hord. O. F. Hinkley will commence business at Alexandria, Mo., on or about August 15th.

Connellsville and Durham Coke Wages.

The Durham region in England and the Connellsville region in America are not only the two largest coke producing regions in the two countries, but in the world. The ovens in both regions are bee-hive and about the same size. The wages in the Durham region are: For drawing coke per ton, 10 cents; drawing coke and loading into cars, \$1.05; levelling and daubing, per oven, 7 cents; chargers, per day, \$1.01; laborers, per day, 68 cents. The wages in the Connellsville region are: For drawing coke per ton, 23½ cents; levelling, per oven, 9½ cents; charging with horses and mules, per oven, 3 cents; other charges, per day, \$1.50; laborers, per day, \$1.27. These figures show a considerable gain for the Connellsville region.

Calculations as to the speed of an electric locomotive and train of the weight of the Empire State express, running at a speed of 70 miles an hour, show that, without increased cost of coal, the electric motors could make a speed of 103 miles per hour, indicating that much higher speeds are economically possible with electric motors.

St. Louis Prices and Discounts for Heavy Hardware and Metals

Iron and Nails.

Local concessions on car loads.

Common Iron—

\$1.50 rates.

Refined Iron—

Norway iron—35¢ card

Horse and Mule Shoes—

Horse shoes, all sizes, \$3.35 per 30

Mule shoes, all sizes, \$3.85 per 30

Crowbars—

per lb.

Wedge point, ordinary sizes, iron, steel pointed, extra

Wedge point, ordinary sizes, steel, extra

Pinch point, same prices as above

Wire Nail Card—

National Wire Nail Card (in keg), adopted July 19, 1895.

COMMON FENCE, SHINGLE, RACCO, FLOORING AND COMMON BRADS—

Advance over basing rate

100 lb. 60d., \$0.50 100 lb. 50d., \$0.50

80 lb. 60d., \$0.30 80 lb. 50d., \$0.30

60 lb. 60d., \$0.20 60 lb. 50d., \$0.20

40 lb. 60d., \$0.15 40 lb. 50d., \$0.15

20 lb. 60d., \$0.10 20 lb. 50d., \$0.10

10 lb. 60d., \$0.05 10 lb. 50d., \$0.05

5 lb. 60d., \$0.03 5 lb. 50d., \$0.03

2 lb. 60d., \$0.01 2 lb. 50d., \$0.01

1 lb. 60d., \$0.005 1 lb. 50d., \$0.005

Barbed box, the advance over smooth.

SMOOTH FINISHING NAILS—

100 lb. larger 70 4d. \$1.45

80 lb. 70 4d. \$1.25

60 lb. 70 4d. \$1.10

40 lb. 70 4d. \$0.85

20 lb. 70 4d. \$0.60

10 lb. 70 4d. \$0.40

5 lb. 70 4d. \$0.25

2 lb. 70 4d. \$0.15

1 lb. 70 4d. \$0.10

100 lb. 70 4d. \$1.45

80 lb. 70 4d. \$1.25

60 lb. 70 4d. \$1.10

40 lb. 70 4d. \$0.85

20 lb. 70 4d. \$0.60

10 lb. 70 4d. \$0.40

5 lb. 70 4d. \$0.25

2 lb. 70 4d. \$0.15

1 lb. 70 4d. \$0.10

100 lb. 70 4d. \$1.45

80 lb. 70 4d. \$1.25

60 lb. 70 4d. \$1.10

40 lb. 70 4d. \$0.85

20 lb. 70 4d. \$0.60

10 lb. 70 4d. \$0.40

5 lb. 70 4d. \$0.25

2 lb. 70 4d. \$0.15

1 lb. 70 4d. \$0.10

100 lb. 70 4d. \$1.45

80 lb. 70 4d. \$1.25

60 lb. 70 4d. \$1.10

40 lb. 70 4d. \$0.85

20 lb. 70 4d. \$0.60

10 lb. 70 4d. \$0.40

5 lb. 70 4d. \$0.25

2 lb. 70 4d. \$0.15

1 lb. 70 4d. \$0.10

100 lb. 70 4d. \$1.45

80 lb. 70 4d. \$1.25

60 lb. 70 4d. \$1.10

40 lb. 70 4d. \$0.85

20 lb. 70 4d. \$0.60

10 lb. 70 4d. \$0.40

5 lb. 70 4d. \$0.25

2 lb. 70 4d. \$0.15

1 lb. 70 4d. \$0.10

100 lb. 70 4d. \$1.45

80 lb. 70 4d. \$1.25

60 lb. 70 4d. \$1.10

40 lb. 70 4d. \$0.85

20 lb. 70 4d. \$0.60

10 lb. 70 4d. \$0.40

5 lb. 70 4d. \$0.25

2 lb. 70 4d. \$0.15

Sheet and Galvanized Iron.

No. Common. Refined. Soft.

16.....\$2.40 \$2.50 \$2.40

18.....2.45 2.50 2.40

20.....2.50 2.50 2.40

22.....2.60 2.50 2.40

24.....2.70 2.50 2.40

26.....2.80 2.50 2.40

28.....2.90 2.50 2.40

30.....3.00 2.50 2.40

32.....3.10 2.50 2.40

34.....3.20 2.50 2.40

36.....3.30 2.50 2.40

38.....3.40 2.50 2.40

40.....3.50 2.50 2.40

42.....3.60 2.50 2.40

44.....3.70 2.50 2.40

46.....3.80 2.50 2.40

48.....3.90 2.50 2.40

50.....4.00 2.50 2.40

52.....4.10 2.50 2.40

54.....4.20 2.50 2.40

56.....4.30 2.50 2.40

58.....4.40 2.50 2.40

60.....4.50 2.50 2.40

62.....4.60 2.50 2.40

64.....4.70 2.50 2.40

66.....4.80 2.50 2.40

68.....4.90 2.50 2.40

70.....5.00 2.50 2.40

72.....5.10 2.50 2.40

74.....5.20 2.50 2.40

76.....5.30 2.50 2.40

78.....5.40 2.50 2.40

80.....5.50 2.50 2.40

82.....5.60 2.50 2.40

84.....5.70 2.50 2.40

86.....5.80 2.50 2.40

88.....5.90 2.50 2.40

90.....6.00 2.50 2.40

92.....6.10 2.50 2.40

94.....6.20 2.50 2.40

96.....6.30 2.50 2.40

98.....6.40 2.50 2.40

100.....6.50 2.50 2.40

102.....6.60 2.50 2.40

104.....6.70 2.50 2.40

106.....6.80 2.50 2.40

108.....6.90 2.50 2.40

110.....7.00 2.50 2.40

112.....7.10 2.50 2.40

114.....7.20 2.50 2.40

116.....7.30 2.50 2.40

118.....7.40 2.50 2.40

120.....7.50 2.50 2.40

122.....7.60 2.50 2.40

124.....7.70 2.50 2.40

126.....7.80 2.50 2.40

128.....7.90 2.50 2.40

130.....8.00 2.50 2.40

132.....8.10 2.50 2.40

134.....8.20 2.50 2.40

136.....8.30 2.50 2.40

138.....8.40 2.50 2.40

140.....8.50 2.50 2.40

142.....8.60 2.50 2.40

144.....8.70 2.50 2.40

146.....8.80 2.50 2.40

148.....8.90 2.50 2.40

150.....9.00 2.50 2.40

152.....9.10 2.50 2.40

154.....9.20 2.50 2.40

156.....9.30 2.50 2.40

158.....9.40 2.50 2.40

160.....9.50 2.50 2.40

162.....9.60 2.50 2.40

164.....9.70 2.50 2.40

166.....9.80 2.50 2.40

168.....9.90 2.50 2.40

170.....10.00 2.50 2.40

172.....10.10 2.50 2.40

174.....10.20 2.50 2.40

Brass Tubing.

Iron Pipe sizes:

1/2 in. 1/4 3/8 1/2 3/4 1 in.

Price—Nos. 20 25 30 35 40 45

Price—Nos. 50 55 60 65 70 75

Price—Nos. 80 85 90 95 100 105

Price—Nos. 110 115 120 125 130 135

Price—Nos. 140 145 150 155 160 165

Price—Nos. 170 175 180 185 190 195

Price—Nos. 200 205 210 215 220 225

Price—Nos. 230 235 240 245 250 255

Price—Nos. 260 265 270 275 280 285

Price—Nos. 290 295 300 305 310 315

Price—Nos. 320 325 330 335 340 345

Price—Nos. 350 355 360 365 370 375

Price—Nos. 380 385 390 395 400 405

Price—Nos. 410 415 420 425 430 435

Price—Nos. 440 445 450 455 460 465

Price—Nos. 470 475 480 485 490 495

Price—Nos. 500 505 510 515 520 525

Price—Nos. 530 535 540 545 550 555

Price—Nos. 560 565 570 575 580 585

Price—Nos. 590 595 600 605 610 615

Price—Nos. 620 625 630 635 640 645

Price—Nos. 650 655 660 665 670 675

Price—Nos. 680 685 690 695 700 705

Price—Nos. 710 715 720 725 730 735

Price—Nos. 740 745 750 755 760 765

Price—Nos. 770 775 780 785 790 795

Price—Nos. 800 805 810 815 820 825

Price—Nos. 830 835 840 845 850 855

Price—Nos. 860 865 870 875 880 885

Price—Nos. 890 895 900 905 910 915

Price—Nos. 920 925 930 935 940 945

Price—Nos. 950 955 960 965 970 975

Price—Nos. 980 985 990 995 1000 1005

Price—Nos. 1010 1015 1020 1025 1030 1035

Price—Nos. 1040 1045 1050 1055 1060 1065

Price—Nos. 1070 1075 1080 1085 1090 1095

Price—Nos. 1100 1105 1110 1115 1120 1125

Price—Nos. 1130 1135 1140 1145 1150 1155

Price—Nos. 1160 1165 1170 1175 1180 1185

Price—Nos. 1190 1195 1200 1205 1210 1215

Price—Nos. 1220 1225 1230 1235 1240 1245

Price—Nos. 1250 1255 1260 1265 1270 1275

Price—Nos. 1280 1285 1290 1295 1300 1305

Price—Nos. 1310 1315 1320 1325 1330 1335

Price—Nos. 1340 1345 1350 1355 1360 1365

Price—Nos. 1370 1375 1380 1385 1390 1395

Price—Nos. 1400 1405 1410 1415 1420 1425

Price—Nos. 1430 1435 1440 1445 1450 1455

Price—Nos. 1460 1465 1470 1475 1480 1485

Price—Nos. 1490 1495 1500 1505 1510 1515

Price—Nos. 1520 1525 1530 1535 1540 1545

Price—Nos. 1550 1555 1560 1565 1570 1575

Price—Nos. 1580 1585 1590

Chisels.	Files.	Dis.	CROSS-CUT SAW HANDLES.	Knives.	Nuts.	Rakes.
SOCKET, FRAMING AND FIMMER	Best brands.	60¢/10¢/10¢/10¢/10¢	Good brands.	dis. 10	Lat Dec. 1889.	Cast steel.
P. S. & W.	Second quality.	70¢/10¢/10¢/10¢/10¢	Stubs imported.	dis. 10	Off list.	Association list.
Merrill.	Stubs imported.	75¢/10¢/10¢/10¢/10¢		dis. 10	Hexagon, plain.	Outside goods.
Mix.				dis. 10	Square, 1 1/2 in.	Malleable.
Ohio Tool Co.				dis. 10	Square, 1 1/2 in.	Gilbs' Aun.
Merrill.				dis. 10	Flat pressed.	Clinton lawn.
L. J. & J. White.				dis. 10	Square, 1 1/2 in. Standard.	Razors.
Douglas.				dis. 10	Hexagon, U. B. Standard.	J. R. Torrey Razor Co.
TANGED AND MISCELLANEOUS.				dis. 10	Hexagon, S. & S. Standard.	Woolen.
Tanged trimmers.				dis. 10	10 packages of 100 lb. and 1 1/2 in.	Bulcher.
Butcher's.				dis. 10	10 lb. net; in packages less than 1.0 lb. add 1/2 lb. net.	Rivets and Burrs.
Speat & Jackson's.				dis. 10		Copper.
Stearns' Buck.				dis. 10		Iron Norway.
Cold chisels, 1/2 lb.				dis. 10		Norway quality.
Chisels.				dis. 10		Tools.
Each. Dis.				dis. 10		Boxwood.
Boach patent.				dis. 10		Iron.
Morse's adjustable.				dis. 10		Sharret rule and straight edge, steel.
Dunbury.				dis. 10		Rods.
Structure, Balz patent.				dis. 10		Stair, black walnut.
Clamps.				dis. 10		Stair, brass.
Adjustable, Cincinnati.				dis. 10		Rope.
Stearns'.				dis. 10		For cash in 10 days.
Carriage makers, Sargent's.				dis. 10		Manufacturers' Prices.
Eberhard Mfg. Co.				dis. 10		Ma's A, 7-16 in. and larger.
Warner's.				dis. 10		Manila 8 in. and larger.
Barnes machinists'.				dis. 10		Manila 6 in. and 5-16 in.
Barnes' machinists'.				dis. 10		Man, hay rope, medium.
Carpenters', Cincinnati.				dis. 10		Sisal, 7-16 in. and larger.
Cleavers, Butcher's.				dis. 10		Sisal, 4 in. and 5-16 in.
New Haven Edge Tool Co.'s.				dis. 10		Sisal, hay rope.
Beatty's.				dis. 10		Sisal, 4 in. and larger.
L. J. & J. White.				dis. 10		Cotton rope best, 1/4 in. and larger.
Corkscrews.				dis. 10		Medium, 1/4 in. and larger.
Humason & Beckley Mfg. Co.				dis. 10		Common, 1/4 in. and larger.
Williamson's.				dis. 10		Julie rope.
Detroit Cork Screw Co.				dis. 10		Wire Rope.
Hove Bros. & Hubert.				dis. 10		List Sept. 1, 1894.
Corn Knives and Cutters.				dis. 10		Nad Irons.
Bradley's.				dis. 10		Per lb. net, from 1 to 10.
Wadsworth's.				dis. 10		Sash Weights.
Cradles.				dis. 10		Sash weights, 7 lb. ton lot \$13 50/100 lb.
Grain.				dis. 10		Saws.
Curry Combs.				dis. 10		Atkins' cross cuts, new list.
Fitch's.				dis. 10		Malay, mill and drag.
Brass, P. S. & W.				dis. 10		One-man saw.
Gilbs' magnetic, per doz. \$1 40				dis. 10		Hand compass.
Drawing Knives.				dis. 10		Distinction's circular.
Witherly.				dis. 10		Cross cut, list Jan. 1, '93.
P. S. & W.				dis. 10		Hand.
Mix.				dis. 10		C. E. Jennings & Co.'s.
Merrill.				dis. 10		Pence circular and mill.
Bradley's.				dis. 10		Cross cut, list Jan. 1, '93.
Adjustable handle.				dis. 10		Hand, panel and rip.
Wilkinson's folding.				dis. 10		Richardson's hand, etc.
Drills and Drill Stocks.				dis. 10		Circular and mill.
Blacksmith's, each.				dis. 10		X cuts, list Jan. 1, '93.
Self-feeling, each \$7.50.				dis. 10		Sinclair's circular.
Brass, P. S. & W.				dis. 10		Present ground cross cut.
Wilson's.				dis. 10		One-man cross cut.
Miller's Falls, each \$3.				dis. 10		Large, mill circular.
Bradley's.				dis. 10		Wheeler, Madden & Clem.
Moore's triple action.				dis. 10		One-man cross cut.
Reich drill, Stearns'.				dis. 10		Large, mill circular.
Automatic boring tool.				dis. 10		Wheeler, Madden & Clem.
each.				dis. 10		St. Mfg. Co.
TWIST DRILLS.				dis. 10		Cross cuts, list Jan. 1, '93.
Diamond, W. & B. 50¢/10¢/10¢/10¢/10¢				dis. 10		Hand, panel and rip.
Graham's patent.				dis. 10		HACK SAWS
50¢/10¢/10¢/10¢/10¢				dis. 10		Griffin's complete.
50¢/10¢/10¢/10¢/10¢				dis. 10		Star saws and blades.
50¢/10¢/10¢/10¢/10¢				dis. 10		SCROLL SAWS
50¢/10¢/10¢/10¢/10¢				dis. 10		Barnes' No. 1, 38; No. 6, 110.
50¢/10¢/10¢/10¢/10¢				dis. 10		Barnes' saw blades.
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50¢/10¢/10¢/10¢/10¢				dis. 10		Hussey, Binns & Co.
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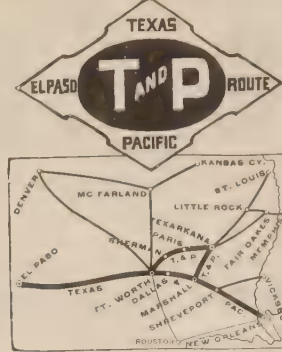
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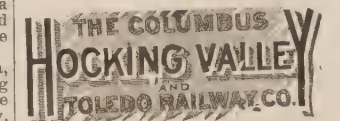
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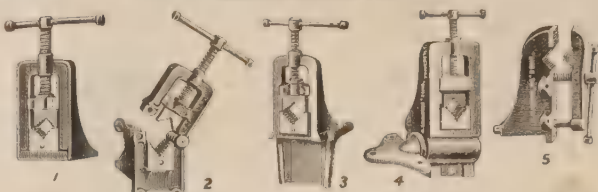
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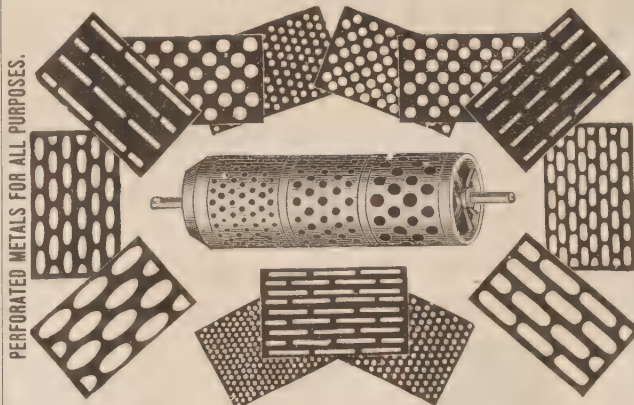
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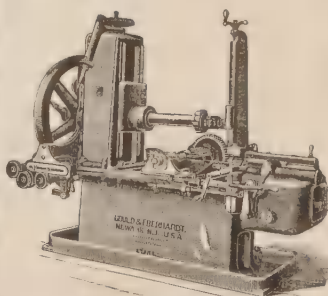
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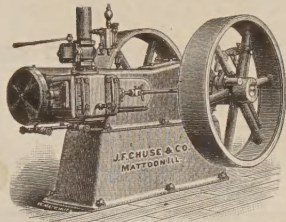
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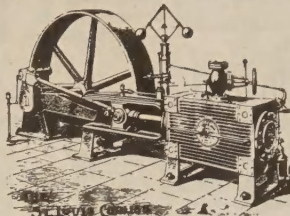
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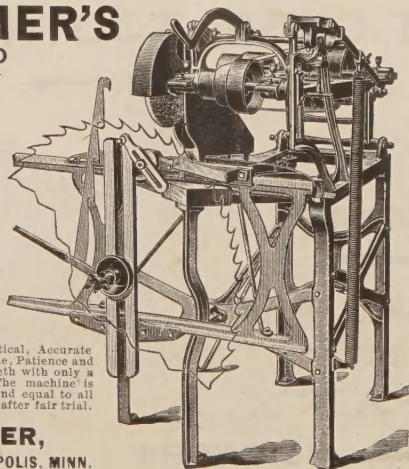
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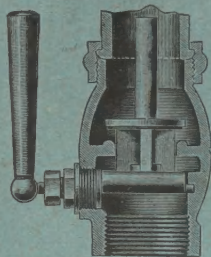
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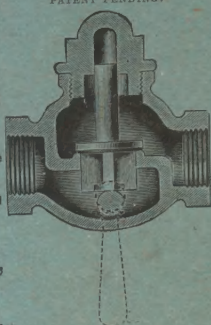
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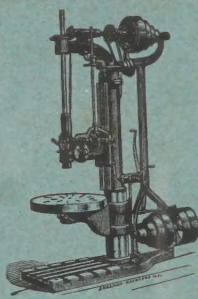
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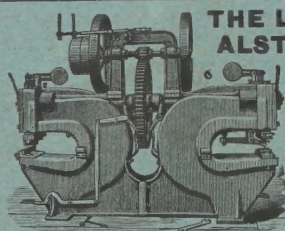
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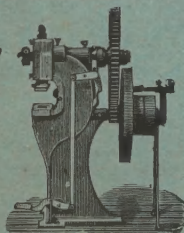
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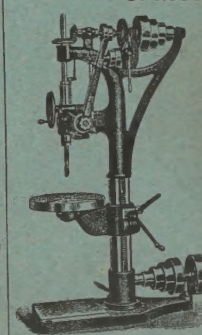
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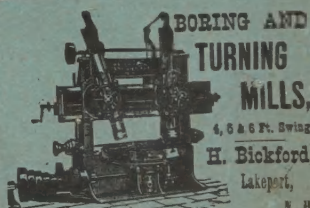


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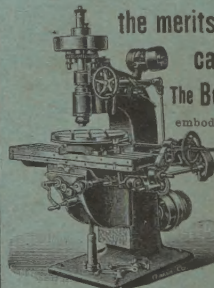
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